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U. S. ARMY ENGINEER DIVISION
NEW ENGLAND
CORPS OF ENGINEERS
424 Trapelo Road
Waltham 54, Massachusetts

MINUTES OF PUBLIC HEARING

ON

NARRAGANSETT BAY HURRICANE SURVEY

Newport, Rhode Island
April 15, 1964

PHILIP H. AND LAWRENCE W. BURT
SHORTHAND REPORTERS
SEVEN WATER STREET
BOSTON 9, MASSACHUSETTS

U. S. ARMY ENGINEER DIVISION
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NARRAGANSETT BAY HURRICANE SURVEY

BEFORE:

Brigadier General Peter C. Hyzer, U.S.A.,
Presiding Officer

John William Leslie, Chief, Engineering Division

Roger C. Albiston
Edward L. Hill
John B. McAleer

City Hall Council Chambers
Newport, Rhode Island
Wednesday, April 15, 1964
8:00 p.m.

INDEX OF SPEAKERS

CERTIFICATE

Commonwealth of Massachusetts

Suffolk, ss.

This is to certify that the attached proceedings of the U. S. Army Engineer Division, New England, Corps of Engineers, in the matter of a hearing on Narragansett Bay Hurricane Survey was duly held at City Hall Council Chambers, Newport, Rhode Island, on Wednesday, April 15, 1964, commencing at 8:00 p.m., as therein appears, and that this is the original transcript thereof for the files of the said New England Division, Corps of Engineers.

Santo J. Aurelio, Official Reporter

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matters which can in any way affect the work of the Coast Guard

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BRIG. GEN. HYZER. Ladies and gentlemen, the hearing will please come to order.

By way of introduction, my name is Peter C. Hyzer, and I am a Brigadier General in the Corps of Engineers, United States Army. I am the Division Engineer of the New England Division of the Corps of Engineers. The Division office is in Waltham, Massachusetts.

With me this evening are Mr. John William Leslie, Chief of the Engineering Division, and several of his assistants: Messrs. Edward L. Hill, John B. McAleer, and Roger C. Albiston, who have been engaged on the hurricane survey.

The purpose of this hearing was explained formally in a public notice which was sent to all officials and organizations known to be interested in it. We have copies of that notice here at the desk; also a list of all the people to whom it was sent.

Anyone who wishes to examine the notice or the list after the close of the hearing is welcome to do so. I will not read this notice of the public hearing into the record inasmuch as every body has, I presume by your presence, received a copy.

In order that everybody may understand clearly the purpose of this meeting, I believe it would be

worth my taking a few minutes to discuss very briefly and very generally the background of the hearing and what we hope it will accomplish for you and for us.

The studies that have been made of the hurricane tidal flood problem in Narragansett Bay below Fox Point indicate that a protection plan consisting of barriers across the East and West Passages of the bay and across the Sakonnet River is feasible and economically justified. This plan, which is presented for your consideration tonight, will be more fully described a little later this evening by engineers from the New England Division that have been actively engaged on this study.

This public hearing is very important to both you and us for several reasons. First, it affords you an opportunity to present your need for protection. You are the ones who are in the best position to know the real need, if any, for hurricane protection measures in this area. Second, it gives us a chance to inform you of the work that has been accomplished on the survey and to describe to you the protection plan which we believe to be practicable and merit particular attention. Third, the hearing is important because it will give everybody a chance to express his views frankly and fully. Whether you favor the plan of protection we will describe, other remedial measures, or no plan at all, you should feel

entirely free to express your opinion. The Corps of Engineers, in the preparation of the report on the hurricane survey, will weigh carefully all the evidence and arguments presented at these public hearings.

Everything that bears on the problem of hurricane-tidal flooding in this area which anyone wants considered in the Division Engineer's study should be presented at one of these hearings, if possible. In general, additional evidence and arguments ought not to be presented later unless they are new and you can show good reason why they could not have been brought out at these hearings. If anyone does submit new material later, it will be brought to the attention of other interests who might oppose it. They will be given ample opportunity to answer any new evidence so that the decision of the Department of the Army will be entirely fair to everyone concerned in this matter.

My plan for conducting this hearing is to first have representatives of the New England Division office describe briefly the results of our studies and, with the aid of a few slides and a film, explain a plan for the protection of Narragansett Bay below the Fox Point Barrier. Following this, all those who favor the particular plan of protection which we were requested to study will be given a chance to speak and to support their stand on

this matter. After we have heard from those who favor this plan, we will give the same opportunity to anyone who is opposed in any way. Finally, there will be an opportunity for questions and rebuttal.

I want to assure you that in the conduct of these hearings there will be in no sense any cross-examination of any person who wishes to speak and present his view. So that we may have as orderly a meeting as possible, and have the evidence presented as clearly as possible, I should like to request that there be no interruptions for rebuttal.

When you address the meeting, it would help everyone if you will come up to the front and state your name and that of any business or interest you may represent. If you speak for yourself, merely say so. Please try to speak as distinctly as you can as we are making a stenographic record of the meeting. We want to be able to review the evidence of everyone in our study, and we want to be sure that everything you say is included in the record. Anyone who has a written statement may read it into the record if he wishes or, if he prefers, he may leave it at the stenographer's desk to be read into the record. Copies of the records of the hearing may be obtained at an individual's own expense -- at the cost of reproduction. If a copy is desired,

arrangements should be made with the stenographer before you leave.

Each of you has been issued one of these attendance cards. If you have not filled one out, would you please do so, giving your mailing address, occupation, and name of the firm or organization that you represent. A record of the attendance will form a part of the minutes of this hearing which will be sent to the Chief of Engineers in Washington, D. C., along with my report. Please turn in your attendance card before you leave.

At this time, I would like to present Mr. John William Leslie, Chief of our Engineering Division, under whose directions these hurricane studies have been conducted. Mr. Leslie will discuss some of the studies and investigations which we have had made to determine the effects that hurrican barriers might have on the natural resources of the bay. He will also describe briefly the various components of the structures.

Mr. Leslie?

MR. LESLIE. In order that those present here tonight may be fully apprized of the backgroumd leading to the undertaking of the study to be discussed and the plan that has evolved after nearly nine years of concentrated and detailed study, the Corps of Engineers will offer a factual presentation. We will discuss the

study authorization, the proposed plan, its impact on the natural conditions of the bay, the role of cooperating agencies, and the cost and economics of the project.

AUTHORIZATION

I would like to quote verbatim from Public Law 71, 84th Congress, 1st session, adopted 15 June 1955, which reads:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled. That in view of the severe damage to the coastal and tidal areas of the eastern and southern United States from the occurrence of hurricanes, particularly the hurricanes of August 31, 1954, and September 11, 1954, in the New England, New York, and New Jersey coastal and tidal areas, and the hurricane of October 15, 1954, in the coastal and tidal areas extending south to South Carolina, and in view of the damages caused by other hurricanes in the past, the Secretary of the Army, in cooperation with the Secretary of Commerce and other Federal agencies concerned with hurricanes, is hereby authorized and directed to cause an examination and survey to be made of the eastern and southern seaboard of the United States with respect to hurricanes, with particular reference to areas where severe damages have occurred.

"SEC. 2. Such survey, to be made under the direction of the Chief of Engineers, shall include the securing of data on the behavior and frequency of hurricanes, and the determination of methods of forecasting their paths and improving warning services, and of possible means of preventing loss of human lives and damages to property, with due consideration of the economics of proposed breakwaters, seawalls, dikes, dams, and other structures, warning services, or other measures which might be required."

Under the direction of this law, and funds provided by the Congress, the New England Division on 15 February 1957 submitted to the Congress an Interim Report on the Narragansett Bay Area in which it recommended a two-unit plan of (1) the construction of a barrier at Fox Point for the protection of the City of Providence and (2) a series of Lower Bay Barriers in the East and West Passages and Sakonnet River <u>subject to further studies</u> of: foundation conditions; agreement with the Department of the Navy on acceptable navigation openings; effects on water quality and pollution in the Bay; and effects on fish, wildlife and recreation.

It might be well to note that prior to submission of the report public hearings to set forth the findings of that report, similar to what we do here tonight, were

held in Providence, Newport, and Fall River on 1, 2 and 3 October 1956. A total of 379, composed of Federal, state and local officials; civic, commercial and industrial representatives; and private individuals attended. A majority of the attendees concurred in the proposed recommendations. The then Governors of Rhode Island and Massachusetts urged the carrying on of intensive and detailed studies.

As you know, the Congress authorized the construction of the Fox Point Project, representating the first major project in hurricane engineering, and it is now under construction. I might state that as a result of the quoted original authorization that projects have been authorized for Narragansett Pier and Point Judith, Rhode Island; New Bedford and Wareham, Massachusetts; Pawcatuck, Mystic, New London, Westport, and Stamford, Connecticut and are presently under construction or design. An additional project has been submitted for Westerly (Misquamicut) Rhode Island. These reports complete the surveys for New England.

PROPOSED PLAN

Many of you are generally familiar with the plan of protection through the media of newspapers and television or through the information bulletin of the Notice of Public Hearing. The information bulletin is

available this evening and, in addition, there is a handout including the general plan, details of the three major barriers, and photographs of the Waterways Experiment Station bay model. It is felt that these will make you more knowledgeable of the technical aspects and provide a reference for the discussion period.

I would like to limit the presentation on the physical features so that more time may be available for the questions that I know you have. However, I should like to call attention to certain germane factors:

(1) The proposed plan is the evolution of some 15 plans. Considering the flooded areas depicted on your general plan, it was early decided that it was impractical to protect each community individually without constructing a modified Chinese Wall surrounding the Bay.

(2) The hydraulic information used as a basis of design is not purely theoretical but gained from a detailed scale model constructed at the Waterways Experiment Station of the Corps of Engineers at Vicksburg, Mississippi. This model also provided the workshop for the resolution of many of the associated problems of salinity, pollution, water temperature, and current velocities.

(3) The components of the several structures are the product of sound engineering principles and represent the latest thinking and recommendations of the

leaders in this new field of engineering.

(4) The structures are basically massive rock-filled dams founded on carefully explored foundations and each provided with an ungated navigation opening. The openings are:

East Passage - 1500' @ a depth of minus 60' M.L.W. (1718' @ M.L.W.)

West Passage - 400' @ a depth of minus 40' M.L.W. (520' @ M.L.W.)

Sakonnet River - 100' @ a depth of minus 20' M.L.W. (166' @ M.S.L.)

(5) The 1956 plan has been modified by the inclusion of sluice gates in the East and West Passages, normally open and closed only during hurricanes, to provide greater sluicing area to the Bay for tidal interchange. As a result of the modifications to the openings and the addition of sluiceways, the total waterway has been increased from that of earlier studies from 63,000 square feet to 172,000 square feet during normal tidal conditions.

(6) The orientation and location of the East Passage barrier is the result of intensive studies to provide the best navigation course for vessel handling.

IMPACT OF NATURAL CONDITIONS

The Congress has charged us with the investigation of the side effects of such a huge project. We have been fully cognizant of these aspects and are convinced that

they have been impartially analyzed and resolved and that our charge has been met. Many of the problems have been in the field of specialists not on our staff. To evaluate the potential problems we have used the services of some thirteen agencies skilled in the knowledge of the field.

I will now show you our film.

(Film exhibited.)

BRIG. GEN. HYZER. Before Mr. Leslie continues, the custodian has asked me that we not smoke. It's filling up the room. Nobody is going to suffer any more than I (pointing to pipe).

MR. LESLIE. I will now take up the point that I left off at before the film was shown.

At this time I would like to introduce Mr. John B. McAleer, a member of the Tidal Hydraulics Committee of Experts in Coastal Engineering, a native of the Bay, and, I might say, a well-known Rhode Island yachtsman, who has been the guiding pilot of this study for the Corps of Engineers since its inception, who will present the problem areas considered and the findings thereof.

After this, I will briefly describe the damages encountered, the benefits of the project, and its cost. The floor will then be open to questions.

Mr. John McAleer.

MR. McALEER. In the studies of barriers we have been concerned with their effects on normal conditions in the Bay. We were trying to maintain the natural conditions unchanged while lowering the hurricane tidal surges in the Bay. Many detailed studies of natural conditions had to be made. For these we obtained the services of eminent experts in many fields.

These included the Narragansett Marine Laboratory, now the Oceanographic Department of the University of Rhode Island, the U. S. Fish and Wildlife Service, the U. S. Public Health Service, the U. S. Army Engineer Research Center and recognized consultants in the coastal engineering field.

Several years of study of natural conditions, observations of tides, currents, tests of salinity and other examinations were made so that natural conditions could be reproduced in the hydraulic models which were constructed at the Waterways Experiment Station in Vicksburg, Mississippi. Adjustments were made in the model to assure accurate reproduction of the complex processes in the Bay. Only after the model was accurately reproducing natural conditions could we proceed to determine the effects of the barriers.

The model tests and hydraulic studies showed, for the plan of the barriers which has been presented to

you, that the tidal range and levels in the Bay will be unchanged. This is with the sluice gates open, as they will be except during a hurricane. The combination of sluice gates and navigation provide one-third of natural waterway area opening into Narragansett and Mt. Hope Bays. The same volume of ocean water moves into and out of the Bay as at present.

Since the ocean water at the entrance is well mixed, it has the same salinity from top to bottom and the barriers would not change conditions. There would be no changes in salinity, temperature, or tidal mixing process that would harm the fishery resources, increase the pollution problem or cause more extensive icing conditions. We found that normal seasonal changes in the Bay are so great that any small effects of the barriers could never be observed or measured.

These were the general conclusions after several years of study by the agencies and individuals which I mentioned previously. Although they have not had an opportunity to make a full evaluation of the latest plans, it is evident that with sluice gates and the larger navigation openings the effect of the barriers on natural conditions would be very small, indeed.

NAVIGATION

We stated that the barriers caused no difference

in tidal range. However, the tide with the barriers would occur 15 minutes later than at the present time. The difference in timing between ocean and bay tides increases the maximum current in the East Passage from 1.5 knots without barriers to 3 knots with the barriers, for a mean tide. These maximum currents at strength of flood or ebb would increase to as much as 4 knots several times each month on spring tides. The strong currents would last a couple of hours and then weaken and reverse in direction.

The Department of the Navy requested large-scale navigation tests which you saw in the film. These tests played an important part in the location and design of the structures and navigation openings. The Navy was satisfied that the barriers would not interfere with the operation of naval vessels. Based on these tests it is also concluded that the barriers would not interfere with commercial navigation.

Now these studies were mainly for the navigation of large vessels through the barrier openings. Small boat navigation is an entirely different problem and I would next like to consider the barriers from the viewpoint of a yachtsman and small boat owner that has to live with these structures.

Actually, I am a small boat sailor on

Narragansett Bay. I live on high ground on the shore of the Bay and sail many races which start and finish in the Newport area. I enjoy watching the America's Cup Races when about 2,000 boats move out through the East Passage; and occasionally I crew in a Newport-Bermuda or Annapolis Race. The barriers are important to small boat owners and yachtsmen for several reasons:

(1) The currents in the navigation openings are increased.

(2) Wave conditions are affected.

(3) The width of the passage is reduced.

1. With the sluice gates in their normal open position the currents in the navigation openings at strength of flood or ebb would be similar to those which now exist in the much narrower Breachway to Point Judith Pond, Galilee, which is extensively used by small boats. Similar currents are encountered off West Chop, Martha's Vineyard. I have sailed or powered through these locations many times and find them not too severe for small boats. Most yachtsmen have encountered much stronger currents, like those in the entrances to Long Island Sound and in the Cape Cod Canal which run 30 to 50 percent higher than the currents in the navigation openings of the proposed barriers.

2. With ebb current against strong southerly

winds the hydraulic model tests show steepening of waves seaward of the barrier. However, the water in the approach area is over 100 feet in depth so the condition is not comparable to shallow inlets or the shoals, bars and crosscurrents in the mouth of a large river. The model also shows sheltered areas in the lee of the breakwater-type barriers and large low-current areas on either side of the barriers. It is my opinion that yachtsmen would become accustomed to the strong currents close to the barriers and soon learn to take advantage of the weak current and smoother water areas on either side of the navigation openings.

3. The 1720 feet, one-third of a mile width on a straight-away, appears adequate for the large numbers of small boats that use the East Passage. This may be compared with the present 2500-feet channel width at the 50° turn at the Dumplings opposite Fort Adams which is one mile north of the East Barrier.

Based on the extensive model studies and review by navigation and tidal hydraulic specialists, it would appear that any disadvantage to commercial navigation and recreational boating interests from passing through the barriers would be offset by the advantages of Hurricane-flood protection for their dock and anchorage areas, marinas, service facilities, boatyards

and storage areas.

The latest plan with sluice gates in the East and West Passage was developed over the last year. The U. S. Fish and Wildlife Service and the U. S. Public Health Service are reviewing their previous reports and recommendations so that their comments may be revised to reflect the larger openings of the plan.

Additional hydraulic model studies of the sluice gates, including the optimum location, and other details of the plan would be made if Congress authorizes the project. Extensive design studies and hydraulic model tests would be required for the final design of such a project. Also, the Fish and Wildlife Service in their original report recommended additional detailed fisheries studies to be initiated upon authorization of the plan.

I thank you, gentlemen.

MR. LESLIE. The passage of time frequently dims our recollections of past events. For this reason, it might be well to reconstruct the hurricane damage picture of three hurricanes of the past 25 years, 1938, 1944 and 1954. The greatest of these was that of 1938 when the still water levels of the Bay, that is the level not counting wave action, rose to 10.8' M.S.L. at Newport and to 15.7' M.S.L. at Providence. Wave action added an additional average of 3.5 feet. It left in its wake

$120 million dollars of damage and the loss of 250 lives. The 1954 hurricane was only one foot lower and that of 1944 four feet lower. The collective damages of the three hurricanes was over $200 million dollars, and the loss of life was over 270 in Rhode Island. There have been other storms and other damages, and based on historical records there will be more storms and more damages.

The three-barrier system as proposed would reduce the still water levels of a storm of the 1938 characteristics by over six feet and the level of wave action by a similar amount. Translated to a dollar value this would eliminate 94% of damages or reduce a $126 million dollar hurricane damage to $8,000,000.

The barriers will not eliminate wind damages; but so as to keep the record straight, I would like to emphasize the fact that the above-cited figures do not include wind damage but flood damage only.

Our present estimated cost of the project is $90 million dollars. Present policy of the Congress is that the Federal government will bear 70% of the cost and that non-Federal interests will bear the remaining 30%.

I thank you.

This ends our technical presentation. I would

like to turn the meeting back to General Hyzer.

BRIG. GEN. HYZER. Thank you, Mr. Leslie.

Well, I would like to hear from somebody not on the platform for a change.

In the interests of giving everyone an opportunity to be heard, please be brief. Try to speak concisely and give us your name and the organization which you represent when I do call on you to speak, and I would hope that we would avoid repetition -- , at least until we have heard all new opinions or facts.

First, I would like to go through this in an orderly fashion. We usually go through Federal, State, and local Government officials and then organizations -- first pro and then con.

Before we open it up, I would like to know whether there are any official representatives of these agencies who have made these studies who have some additional comments. I know that several are represented here. I don't know whether they have additional comments or not.

(Brig. Gen. Hyzer conferred with Mr. McAleer.)

BRIG. GEN. HYZER. We have already mentioned their reports and so forth.

MR. McALEER. All right.

BRIG. GEN. HYZER. I know that some of them

are present. If some of them have something later on in response to these questions, we can call on them then.

I am not aware of any Senators or Congressmen present.

Are any of them represented by any one here?

(No response.)

BRIG. GEN. HYZER. Do we have any other Federal agencies, then, who have official comments to make at this time?

(No response.)

BRIG. GEN. HYZER. All right. Let's go down, then, to the states. Do we have any State agencies represented here who have comments to make at this time?

MR. ISE. General, my name is Henry Ise, Chief of the Division of Harbors and Rivers.

BRIG. GEN. HYZER. Yes, Mr. Ise.

MR. ISE. I wish to be recorded as being present here tonight, but I have no statement to make tonight.

BRIG. GEN. HYZER. Thank you, Mr. Ise.

That was Mr. Ise, Chief of the Rivers and Harbors Division of the State of Rhode Island.

Are there any other State agencies represented here?

THE FLOOR. Sir, did he (Mr. Ise) make a comment?

BRIG. GEN. HYZER. No. He had no comment to make at this time.

MR. McMORROW. General, I would like to make -- I am Frank McMorrow. I am the former Senator from Tiverton, Rhode Island, and I attended the previous three meetings.

The first one was held in Providence at the Classical High School Auditorium. The next one was held here in Newport. The third was held at the Fall River City Hall under the direction of your agency.

At that time we raised some questions with regard to the Sakonnet River and the basin in Tiverton. One of the questions was with regard to the receding waters which I proposed here in Newport.

And at the time I was brought down from the rostrum and told that the answers weren't readily available, but that they would be in Fall River with regard to the receding waters in the Tiverton-Sakonnet Basin.

I also recall at that time that there was the question with regard to the salinity and the pollution that might accumulate behind the barriers. And the Navy, here in Newport at the hearing, brought out the fact that the vessels would have to take a 45-degree turn going through the aperture, and that the channels would have to

be taken care of with regard to the silt that would accumulate.

Now, that was the point raised by the Navy right here in Newport at the time. We tried to point out at the Fall River meeting that the pollution that came from the rivers, the Providence River and the Taunton River in Mt. Hope Bay might be diverted over a wider area than the Sakonnet River south of what was the old stone bridge, as well as Mt. Hope Bay.

The questions that we put forth at the time have never adequately been answered to us.

Now, with regard to the yachtsmen, the question has been put forth that going into the harbor at Point Judith there might be some difficulty in a fog for some of the people who aren't too well acquainted with the navigation aspects of boating, going through an aperture of that type.

And so I put forth those questions to you, as I did in Fall River that night, General, and here in Newport. I attended the three previous meetings. I think General Fleming was the officer in charge, and I later met with General ~~Sitley~~ Sibley, as I recall, in Boston.

BRIG. GEN. HYZER. Thank you, sir.

Do you want to answer these questions as we go along?

(Brig. Gen. Hyzer conferred with Mr. McAleer.)

BRIG. GEN. HYZER. We have had several questions raised relative to the 1956 hearings. I think most of these were answered to a degree at least in the presentations. However, apparently they were not adequately answered. We have the official Department of Navy point of view. If the Navy is represented here, I don't know whether they have any additional comments or not. The Navy has approved the barriers from the point of view of navigation.

John, do you want to get into these other questions?

MR. McALEER. Yes.

These matters have all been considered in the approximately eight years since the last hearing. First was a question of the receding waters. If you visualize this chart of the large amount of water that goes into the bay in a hurricane and the levels, six to seven feet lower, this being the mouth of the bay (indicating) and this being Providence, the reduced level, six to seven feet lower with the barriers, means there is much less hurricane water that goes into the bay with the barriers.

The model tests then showed that with the reduced openings, the outflow current, the ebb currents in a hurricane are approximately the same velocity as they would be without the barriers.

The salinity, I believe I discussed that point, and we answered that question. In other words, the test and studies from the models would indicate that with the present plan providing for a larger navigation opening and the sluice gates, there would be no appreciable change in salinity in the bay.

In regard to pollution from the rivers in the Mt. Hope Bay area, since the same amount of water would flow in and out of the bay with the barriers, it does not appear that there should be any significant change in the pollution in the Mt. Hope Bay area.

With respect to yachtsmen passing through the barrier openings in fog, undoubtedly there would be radio beacons that would mark the ends of the barriers; and, of course, you have that same problem today. You have to pick up the opening in fog conditions, as you do today.

BRIG. GEN. HYZER. All right. Do we have some other representatives of State organizations or other State officials who have statements at this time?

SENATOR SAVAGE. General, I'm Senator Savage from the City of Newport. I'm here to listen. I know that this is a very emotional subject for both the pros and the cons, and I think that it is not a matter of State officials or anybody else to settle. I think that the people

themselves, of course, will settle this thing in their own mind at the proper time. However, I think that your presentation this evening has thrown quite a bit of light on the matter.

Before I sit down, I would say that I think that the former Senator from Tiverton asked a question that you probably overlooked, and that was the silt in the channel.

MR. McALEER. Yes.

BRIG. GEN. HYZER. Thank you.

Do you want to answer that, John?

MR. McALEER. There should be a report here from the Waterways Experiment Station reproducing the shoaling conditions in the bay. In the large model of the bay which you saw, gilsonite -- in other words, a fine material -- was used which simulated the silt load that comes down the rivers.

The Corps of Engineers, from their dredging records and surveys, has about, oh, I think it's 20 years or so of records of dredging. This was reproduced in the model and it quite accurately represented the existing shoaling conditions in the Upper Bay, and then this was run with barriers and there was no measurable change in the silting conditions with the barriers.

BRIG. GEN. HYZER. Are there any other State

officials who have statements at this time?

(No response.)

BRIG. GEN. HYZER. All right. Do we have any city or town officials who have statements at this time?

MR. SHIPPEE. General, I'm Harold E. Shippee, President of the Jamestown Town Council. We voted to come here tonight with an open mind and listen. However, there was one phase of this program that we did vigorously oppose, and that was the quarrying at Fort Wetherill.

Now, is that program still in the wind?

MR. LESLIE. Let me put it this way --

(General laughter.)

MR. LESLIE. It's a million dollar question to you.

MR. SHIPPEE. That's right. It is a very, very important question to Jamestown.

MR. LESLIE. We have made analyses as to where -- in all of our studies -- as to where to get the rock. In looking around, we have come up with a proposal that it can come -- that is, not all of it, but a share of it can come from the naval reservation at Fort Wetherill. This involves approximately a saving of $4,000,000 in the cost of the job.

MR. McALEER. Yes.

MR. LESLIE. In other words, if the project were

to be built not using Fort Wetherill rock, it would cost $90,000,000. If the rock from Fort Wetherill is used, the cost would be reduced by $4,000,000.

Now, in any of these projects, it means that local interests, assuming -- we are investigating further -- but assuming for the moment that local interests pay 30 per cent, then this is $1,000,000 more that local interests will have to pay, and $3,000,000 more that the Government will have to pay.

If local interests aren't willing to do it, I am sure that we won't do it.

I think the greater problem is whether the hurricane barrier is wanted. Where we get it from is another problem.

BRIG. GEN. HYZER. What happens to Fort Wetherill if we take the rock?

(General Laughter.)

MR. LESLIE. Well, it could then be developed. It would be fixed up. In other words, it would not be left as an unsightly gap. All of us in New England know what the bay is. The appearance of Fort Wetherill is a landmark that people like. We would try to dress it up so that it would not be just an open quarry.

(General laughter.)

MR. SHIPPEE. General, I have one more question.

Did I understand you when you first started speaking, that now was the time to object or forever hold your peace on the program itself in its entirety?

BRIG. GEN. HYZER. We would like to get your views, yes. Now, I realize that we have made a presentation here. We have probably presented facts and opinions and studies which many of you are unacquainted with prior to the meeting tonight.

So let me not be quite so specific in this. If your Town Council, for instance, decides to meet and argue this thing over and come up with an official position, I will be very happy to receive it at any time.

MR. SHIPPEE. That was my point, General. We are very deeply concerned with the feelings of our residents of Jamestown. As we are right in the middle of this, there is one phase of it that will help us. That is the raising of Mackerel Cove Road. The dike across Mackerel Cove is something that we have been trying to get done for 10 years, at least 10 years.

Thank you, General.

BRIG. GEN. HYZER. Thank you very much, sir.

Do we have some other towns and cities?

MAYOR HAMBLY. Yes.

BRIG. GEN. HYZER. Yes, sir.

MAYOR HAMBLY. My name is Mayor Charles A. Hambly,

City of Newport.

General Hyzer, gentelmen, I present first -- I'm sorry I didn't see you earlier but I was tied up myself -- a special delivery letter to you. The return postmark is "Yachting".

This (other) letter -- I have only one copy -- I would like to turn over to you. It is from a Mr. William de L. Burgess, who is Superintendent of one of our local estates.

I would like to say that I am happy at the number of people who turned out here this evening to show their great interest in this very important project here. Now, I am speaking as Mayor of the City of Newport. I am not necessarily representing the Council of the City of Newport. They have not at this point taken a stand on this particular issue, and many of the local people know that we go 4 - 3, 5 - 2, 6 - 1. So I wouldn't want to commit any of the Council to my views on this.

I have consulted many people. I've listened to some of the facts. I don't have all of them, but I would like to present my opinions to you. I have not had 9 years of study -- only about two weeks.

This is my statement to you:

DRAFT OF NEWPORT CONFERENCE

I am not about to delve into the technical aspects of these proposed barriers. I believe there are capable and authoritative people here who will speak on such matters as salinity, turbulence, effects on marine life, et cetera. I may touch on a few of these, but merely in general statements or questions.

Primarily, I am interested in the economic situation as it affects Newport and vicinity. In your report you state that there was $11,400,000 damage in 1938. This is the report that was sent out to many people. Also, you state that there was $8,500,000 damage in 1954, not including boats or damage in the Ocean Drive area. Those are the figures listed for Newport. Jamestown is listed separately.

Footnote (1) of the report reads:

"Figures for Providence and Newport do not represent total damages. Damages outside of the study area are not included."

Further down here it reads:

"Damages to naval and commercial vessels, small boats, wharves, and shore structures and salt water damage to automobiles have not been included in the above figures."

Now, those figures for Newport were $11,400,000

and $8,500,000. I have a letter from the Newport Tax Assessor showing the valuation of these areas in 1938 and 1954. The land was not washed out; it is still there. It might appear that some of this damage was from Navy facilities; I don't know.

It would also appear that most of the damage, from what we can gather, was from wind and rain and not from flooding.

I will now give you these figures. In 1938 the assessed valuation of the land was $1,544,750. Now, this is the area of Pink Street, Washington Street, and the area concerned within the inner harbor that might be affected by barriers. This does not include the Ocean Drive area. In 1938 the assessed valuation of the buildings was $2,230,550.

Added together, this makes a total of $3,775,300. That was the valuation of the area in which $11,400,000 damage was done.

Of course, 1938 was a depression year. Still, it is safe to say that the market value of the real estate assessed would not exceed $4,000,000.

In 1954 the total assessed valuation of both land and buildings -- this was the year in which damages were said to have been $8,500,000 -- was $5,344,347. In 1954 the total market value of the real estate assessed as above would not have exceeded $10,000,000.

I also note that damages were adjusted to the 1956 price level, which should not appreciably affect the 1954 price level.

Now, in addition to this, there was some flooding of cellars. I have been able to find a city record dated September 14, 1954, under the letterhead of: The City of Newport, Rhode Island, Department of Public Works, Raymond P. Garcia, Director, to William A. Gildea, City Manager, from John P. Hammond, Superintendent, Sewer Division.

These cellars were pumped out because we realized that this was an emergency. Let me please state this: I don't want the taxpayers to get the idea that we are going to pump out cellars all the time.

(General laughter.)

MAYOR HAMBLY. But we realized that this was an emergency. There are listed some 300 or 400 cellars that were pumped out by the Sewer Division -- because it was an emergency -- at no charge to the landowners or the taxpayers. So we realize emergencies and we take care of the situation.

Now, besides this, I believe you will hear from other investors who are or will be spending monies to develop the waterfront. In this connection I urge Federally-guaranteed flood insurance.

The following quotation is from the Regional Guide Plan Study by the Rhode Island Development Council 1955-1970

from Governor's Study Commission.

"Rhode Island must have better escape routes from shore areas to reduce loss of life and property damage".

This study goes on further to say:

"Highway and bridge plans now under study for the area would provide accessibility needed for full development of the area's fine resources". The proposed South Shore Highway with Bridge linking Newport and Jamestown were seen as highly important possibilities.

Now, this bridge is estimated to cost $40,000,000. The barriers are estimated to cost $90,000,000. I, for one, maintain the bridge at $40,000,000 against $90,000,000 for barriers would do much more for our economy and provided an escape route.

(Applause.)

MAYOR HAMBLY. Of this $90,000,000, $30,000,000 is to be raised on State and local levels. This is money to be put up, not just a guarantee, as was the case with the bridge. This raising of $30,000,000 is an almost impossible task. It would necessarily have to go out to referendum.

I note with interest that a beach appears to be included as a part of this project with the dumping of sand where sand does not now exist. Sand in such areas will continually have to be replaced, and this further may interfere with the livelihood of quahog tongers who work in this

area.

Now, I have a question. What about maintenance and labor after the project is completed? Who pays for this? Who mans the so-called sluice gates?

(Laughter and applause.)

MAYOR HAMBLY. Now, in my untechnical thinking, I come to the tank tests. America Cup yachts have been tested in tanks and shown to be perfect; but in the final analysis, many changes had to be made in the actual boats, and then some did not make the grade.

Here we are to have something that was only tank-tested (and not even there in all aspects), and this will be a permanent thing. Nothing of this sort has ever been built anywhere before. Who wants it?

Some groups, including the Navy, have said that they will go along with it, but they did not ask for it. To tank-test nature and its many quirks seems to me impossible.

Furthermore, no traffic survey of boats in and out of our harbor was made. I believe this increase in tide flow will be bad for sailing craft. As the movie showed, only one boat costing $40,000 was used in the tests.

I have a letter from the New York Yacht Club; and while no stand is taken, it is apparent that the preference is: no barriers. I will quote just a few lines here.

"Yachtsmen in the Lower Bay area are of the opinion that these barriers would prove unnecessary."

Then I have down at the bottom here: "It is my hope that no construction will be put up to mar the comfort and attractiveness of your local waters. Yours sincerely, Chauncy Stillman, Commodore, New York Yacht Club".

This brings us to a purely psychological point. It just might be that boating people -- and this is rapidly becoming a more important economic factor with us -- might bypass us because other harbors and bays would be easier to navigate.

When these studies were begun, the 12-meter boats were not eligible for competition. These bring tremendous traffic in and out and we do not ever expect to lose it.

Now we are to have a squadron of Polaris nuclear submarines in our bay. We welcome them, but let us just suppose the worst: one of these was rammed and sunk in our bay. Are the barriers a help or a hindrance? Nuclear submarines were not considered in this study.

Suppose oil tankers collide within our bay, as has happened. The barriers would probably be a detriment by containing most of the oil within the bay.

As for salinity, if this is less, what about more icing in the Upper Bay areas? I don't believe this was considered.

I have not touched upon commercial fishing and sports fishing because I believe there are other people better versed than I who are here this evening.

Now, many reports on marine life, public health, and so forth have been done. Tests and research show facts and figures in these booklets or pamphlets that I have glanced at, but their summaries could all be stated in one or two words: maybe it will be beneficial and maybe it won't.

In conclusion, I do not believe a hurricane can be duplicated in a tank. I believe our economy here needs spending on such things as bridges and waterfront development with maybe some small nonpolluting-type protection, this in conjunction with the Army Engineers.

I further believe that these barriers would increase the pollution we already have in our bay.

I now present a few clippings here, with apologies to the General (displaying clippings and cartoon).

BRIG. GEN. HYZER. Oh, I love that one.

MAYOR HAMBLY. I love that one, too. This is a cartoon that was in the Providence Journal, and I will not describe it. I think it describes itself very well. I think that it is very well done, and I hope that you are sent the original.

(Laughter.)

MAYOR HAMBLY. I also have here an editorial that was taken from the Providence Sunday Journal, I think, on April 5. This does not specifically pertain to our local situation, but it is an editorial and it describes a talk that Dr. Luther L. Terry, Surgeon General of the United States Public Health Service, gave in the Midwest. I will quote just a few lines here:

"There now is nearly six times as much pollution in our rivers, streams and lakes as 60 years ago, and the amount is still increasing".

We know that we have this situation in our bay, and I think that the Surgeon General of the United States Public Health Service knows what he is talking about.

The headline of another editorial in the Providence Journal says: "THE PROPOSED LOWER BAY BARRIER NEEDS MORE STUDY". My final remarks will take care of that, but they have gone into that quite extensively.

(Laughter.)

MAYOR HAMBLY. Another clipping (from the Newport Daily News): "BARRIERS SEEN CAUSING BAY DETERIORATION". This story is credited to Professor Theodore J. Smayda of the University of Rhode Island. I will not read the whole clipping because I think you are well aware of his views.

Another (Providence Sunday Journal editorial from April 5: "QUAHAUGERS SEE DARK DAYS AHEAD UNLESS R. I.

ACTS". This editorial talks about William J. Nolan of Warren, who is President of the Eastern Seafood Corporation. I will quote a few lines here:

"The hard-shell clams are in areas barred to shellfishermen because the waters are considered polluted.... He endorsed recommendations made recently by the Rhode Island Shellfish Advisory Committee for cleansing quahaugs, ridding the state's waters of pollution and leasing underwater lands for cultivation of shellfish."

That committee has said that studies should be done, and Mr. Nolan agrees with this.

Now, in closing, the editorial says:

He "is opposed to installing hurricane barriers in the lower part of the bay. He fears that such barriers will result in a winterlong ice lock which would bring quahauging operations to a halt during cold weather."

I have another clipping here (from the Providence Sunday Journal) which relates to the Mayor of the City of Fall River, Roland G. Desmaris. Although he does not say anything about our barriers as such, he is forming a committee to study the feasibility of municipal investment in waterfront development, including a harbor bulkhead.

Just last night the Bristol Town Council went on record as opposing these barriers, and they favor local protection in the form of a breakwater in the Bristol Harbor area.

In talking with local yachtsmen, I believe that they, too, would favor local breakwaters for the day-to-day protection. Also, this would help a yacht basin in our area.

In conclusion, studies to clean up the bay would be of greater priority than barriers.

We in Newport would welcome the use of Rose Island for whatever Federal agency, University of Rhode Island, or private agency should wish to establish a research center on pollution.

This is -- no doubt -- one of the finest bays anywhere, and this would be ideal as a base of operations to study pollution.

We appreciate the excellent study of our famous Cliff Walk by the Army Engineers, and we hope to follow up on this project. We further suggest -- in cooperation with the Army Engineers -- that priority be given to bridges, pollution, and small barriers to improve yacht basins.

I would say this: If all answers have not been arrived at after six or seven years of study and over $1,000,000 in cost, then instead of more dollars and years of study, that immediate priority be given to the above-named projects to improve the economy and growth of the area.

(Laughter.)

BRIG. GEN. HYZER. Thank you for your very fine statement. I do not think that I should try at this moment

to answer the many questions which you raised.

Do we have any other city or town officials who have statements at this time?

(No response.)

Well, let's open the meeting up to groups. First, I would like to get proponents. In other words, people who are in favor. I am not sure that I will find very many.

(Laughter.)

BRIG. GEN. HYZER. But it sure would be nice.

(Laughter.)

Do we have anyone officially representing a group or an organization who is in favor of this plan or similar plans of protection?

THE FLOOR. Is that in favor or against?

BRIG. GEN. HYZER. In favor.

(Man sat down.)

(Laughter.)

BRIG. GEN. HYZER. Just wait a moment, sir.

(Laughter.)

BRIG. GEN. HYZER. All right. Do I have any individuals now who have a statement to make in favor of this or similar protection?

THE FLOOR. Not in favor.

BRIG. GEN. HYZER. Oh, excuse me.

(Laughter.)

BRIG. GEN. HYZER. Yes, sir.

THE FLOOR. I'm not in favor of it.

BRIG. GEN. HYZER. No. I want proponents first. Is there anyone who has a statement in favor?

(Dr. Alexander raised hand.)

BRIG. GEN. HYZER. Yes, sir?

DR. ALEXANDER. I'm in favor only obliquely, but I would like to speak on this.

BRIG. GEN. HYZER. All right, sir. Thank you.

DR. ALEXANDER. I am Dr. Lewis Alexander. I am Professor of Geography at the University of Rhode Island. I have been engaged in a three-year study of the bay's resources, and it is as a result of this that I have come here to give you a prepared statement.

I want to emphasize that what I say are my own ideas. They in no way reflect any official policy either by the Univeristy of Rhode Island or by the Office of Naval Research, which has sponsored the work that I have been doing.

So far as hurricane protection is concerned, the people living about Narragansett Bay have three courses of action to choose from.

The first is to adopt the hurricane barrier proposal. Ten years ago, after Hurricane Carol roared up the coast causing tremendous damage, the people of Rhode Island looked about desperately for help in preventing a

recurrent disaster. The answer was an Act of Congress authorizing the Corps of Engineers to prepare a plan for future protection against hurricanes. During the years there have been no disastrous hurricanes in the bay like those of 1954 and that of 1938.

This is a very good proposal that the Engineers have worked out, after spending some $2,000,000 of the taxpayer's money doing it. Certainly the Corps of Engineers cannot guarantee that the construction of the Lower Bay barriers will not to some extent alter the marine environment of the bay.

They have had impartial studies carried out on the ecology of the bay; but in dealing with a water area of this size, predictions are of necessity inexact.

I cannot agree with the sentiments of the Bulletin of last Monday night that the barrier proposal needs further study. The longer we wait for the barriers, the more expensive they become.

And what guarantees might additional study provide so far as sedimentation or water temperatures are concerned? The science of oceanography is a very inexact science. The most that the scientists at the marine laboratory can talk about is "probability". They are giving their best estimates.

There is a term that they use: One can predict with reasonable reliability that the fin fishing and the shell

fishing in the bay would not be significantly affected by the construction of the barriers.

Well, further studies -- with oceanography at its present stage -- could probably not guarantee this at all.

Boat owners are concerned that water velocities will increase in the barrier openings at certain times of the day. This may be true, but think back to September, 1954, and to what happened.

In rejecting the proposal, are we not really concerned over the cost? Twenty-four million dollars is a lot of money for this State to raise. If cost is the chief objection, let's admit it and consider the other alternatives.

A second course of action is to do nothing -- as we have done for the past decade -- and hope for no more hurricanes. The bay will remain unspoiled and Downtown Providence will soon be protected. This probably was what we were going to do anyway, in which case we wasted $2,000,000 of Federal money.

But if we choose to do nothing, how will we feel after Hurricane Carol comes again? Will we turn again to the Federal Government for help?

There is still a third alternative: Reject the barrier proposal but enact legislation on zoning and land acquisition which will drastically cut down property damage and loss of life in low-lying areas.

After the "Carol" episode there was much talk about zoning, new types of home construction, and turning low-lying areas into public parks. The Shore Development Act of 1956 encourages land acquisition by cities and towns along the bay. Yet what community -- besides Warwick -- has moved to do anything about prevention of future hurricane damage?

My argument is that if we turn down the Lower Bay barrier proposal, we should be honest with ourselves as to why we do it; and, further, we should accept the responsibilities of such a rejection. Merely pigeonholing the proposal for "further study" is no answer.

If the communities bordering the bay are worried about damage, then why not take legal steps to cut down the potential costs in the event of future hurricanes? If the people are genuinely concerned about possible damage to the shellfish in the bay, why don't we take advantage of the shellfishing potential, instead of neglecting it as we have done in the past?

The hurricane barrier proposal has for the first time brought the whole bay together as a single geographical unit for study. Now is the time for the Governor of the State to appoint an Advisory Bay Committee for the purpose of analyzing the report of the Corps of Engineers and the objections to it, and reporting its findings to him. Such

a committee could also study other aspects of resource use in the bay in conjunction with representatives from Massachusetts.

To reject the barrier proposal out of hand is unwise unless we adopt remedial measures for protection and resource development. To pigeonhole the report or to send it back to the Engineers for further study is also unwise.

After ten years of inaction, we must face the truth about our present and future use of Narragansett Bay and act accordingly.

Thank you.

(Applause.)

BRIG. GEN. HYZER. Thank you. Do you have any additional copies of that (statement)?

DR. ALEXANDER. You have a copy.

BRIG. GEN. HYZER. Dr. Alexander brings up one point which I think has not been covered in our orientation. I think that I should mention that for your benefit, and that is the procedures. In other words, how do we get this authorized and constructed? This hearing is a part of our study. The Engineers' studies, all these hearings, and the comments from the local interests will be sent to Washington, after which it will be sent to the Governors and to the heads of all the departments at which time they may then officially comment.

In other words, the Governor of Rhode Island and the Governor of Massachusetts must give their official views on this project, which views then go to Congress before it is authorized. After it is authorized, of course, it is never going to be built unless somebody here has got enough drive to get the funds appropriated for construction. I think this is sort of a follow-up on our procedure.

All right. Do we have some other individuals now in favor, proponents in favor?

(Mr. Dunlap raised hand.)

BRIG. GEN. HYZER. Yes, sir?

MR. DUNLAP. My name is Richard M. Dunlap. You can identify me, I think, as a proponent because I wish to agree with a letter written to Senator Pell by Colonel Otto J. Rhody (phonetic) of your office on --

BRIG. GEN. HYZER. Yes, sir.

MR. DUNLAP. -- on 23 January 1964, and I quote from the letter. I can't read the whole letter. I will quote from it but I am not taking anything out of context here.

I would like to agree with that part wherein it says: "The substantial costs and considerable magnitude of the Lower Bay barriers may make it desirable to consider the project as part of the long-range development of the bays."

I think this has been said in another way by

Mayor Hambly. The development of the bay includes many things: yachting, boating, you name it.

I don't believe that we have a recommendation here for who should make this study. Obviously, some local group, joint-state Massachusetts-Rhode Island group, probably is the group to make the long-range program for the development of the bays.

Thank you.

BRIG. GEN. HYZER. Thank you, sir.

MR. DUNLAP. You have a copy of this, of course.

BRIG. GEN. HYZER. What is the date of that?

MR. DUNLAP. 23 January.

BRIG. GEN. HYZER. Yes, we have it in our files.

Are there any other proponents, anybody in favor?

(No response.)

BRIG. GEN. HYZER. All right. Now, I would like first to have people who officially represent organizations and not individuals because I presume that everybody here would like to be heard tonight. But first let's get those who represent a large group of people.

Now, I had one request from the Chamber of Commerce. Apparently, they have something else which they must attend to tonight.

SENATOR SAVAGE. He is right over there.

MR. McALEER. There he is.

BRIG. GEN. HYZER. All right, sir.

MR. HOLBROOK. My name is Holbrook. I'm the Executive Director of the Newport County Chamber of Commerce. There are copies of our statement. This statement is addressed to Brigadier General Hyzer.

"Dear General Hyzer:

The Newport County Chamber of Commerce, representing over six hundred business and professional men and women in Newport, Middletown and Portsmouth, Rhode Island, would like to go on record as raising several questions regarding the proposed Narragansett Bay Hurricane Barriers as suggested by your office as a partial solution to the threat of flooding in the Narragansett Bay area during intensified storms as recorded in 1938 and 1954.

The Board of Directors of the Chamber voted unanimously on April 13, 1964 to register these questions regarding the proposed 'Barrier' proposal after study of the plan and consultation with numerous business interests in the Bay area.

Based on this study and consultation, the Board suggests that:

1.) the question of the effect said 'Barriers' will

have on marine life has not been absolutely defined. The sports and commercial fishing in the Bay is of considerable importance and the effect of the Barrier on this phase should be more accurately defined.

2.) there is still a serious question as to effects on salinity, pollution, and other changes that could result in significant variations in the Bay including changes of temperature resulting in freezing, dock damage, etc.

3.) there is considerable question that the construction of these Barriers will limit and imperil the passage of small boats. This limitation could have disastrous effects upon the growing boating-recreation industry so important to Bay communities.

4.) there is unanimous opinion that the construction of the Barriers will drastically affect the aesthetics of the Bay entrances. Any adverse effect in this area could have a severe effect on the attractiveness of the Bay.

5.) the proposed Tiverton Barrier could, in the opinion of our organization, produce an intensified water damage effect on those areas on the Sakonnet River south of the Barrier. There is also real concern that the build up of water during storms adjacent to the East and West Passage Barriers could result in intensified flooding in those exposed shore areas adjacent to the Barriers.

6.) there is also the serious question of the costliness of the project to the State of Rhode Island and communities on the Bay. This multi-million dollar investment which would necessarily be required by the State of Rhode Island and Bay communities is even more concerning to our organization in light of the other projects requiring state participation which we feel hold priority (i.e. Cliff Walk Restoration).

Before such a massive investment were to be made we suggest that such areas as improved weather forecasting and federal participation or guarantee for realistic insurance rates for low lying shore property owners be studied.

Based on these questions we cannot endorse the proposal.

Sincerely yours,

Jack W. Roach
President".

(Applause.)

BRIG. GEN. HYZER. Now, are there other organizations?

(Mr. Hoskins raised hand.)

BRIG. GEN. HYZER. Yes, sir. I know that you were on your feet before.

MR. HOSKINS. Thank you, sir.

My name is Robert F. Hoskins and I represent the Newport County Salt Water Fishing Club, Inc. I have been directed to read this, but I feel that I should not because of the risk of being repetitious, of being redundant; so I will --

BRIG. GEN. HYZER. We have copies (of your statement). If you would like to read it or summarize it, fine.

MR. HOSKINS. All right. I will read it, then. This is addressed to:

"Division Engineer
U. S. Army Engineer Division
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

At the regular monthly meeting of the Newport County Salt Water Fishing Club, Inc. held on April 17, 1964 a resolution was adopted that the club go on record in opposition to the proposed construction of the Narragansett Hurricane Barriers. The membership, comprising 364 sport fishermen, in approving the resolution did so without a dissenting vote.

Our objections to the barriers are:

1. A menace to navigation in and out of the harbor.
2. Pollution problems in the bay would increase.
3. Detrimental to the commercial and shellfish industry.
4. Reduction of the salinity within the bay.
5. Greatly curtail the species of fish that inhabit the bay.
6. All sections of our state south of the barriers would be subject to a greater degree of destruction and erosion caused by higher tides.
7. Resulting higher tides along our southern shores would take its toll of land inch by inch. Soon we would not recognize our beaches as they exist today.
8. Newport's attraction as a recreation and vacation area would lose its appeal to tourists

that enjoy boating, bathing and sport fishing, thus adversely affecting the economy of our city. For these reasons, we ask the Division of Army Engineers not to make any changes in the present status quo in Narragansett Bay.

Very truly yours,

Robert F. Hoskins,
President".

I would like to add to this and say that if nothing else, these barriers, if built, would make a fine antisubmarine net.

(Laughter.)

I also would like to say that you have shown us models of a ship in a basin and you state that commercial ships can pass or make passage through this open gate with minimum amount of trouble. The gentleman (Mr. McAleer) alongside of you said that he is a small boat owner and that his small boat went to Bermuda. Mine won't. I can picture in my mind the way some of the Navy ships go out of here. If they are going through that gate, me with my outboard, I'm in trouble.

(Laughter and applause.)

MR. HOSKINS. Thank you very much.

BRIG. GEN. HYZER. Thank you, sir.

MR. BOURNE. Mr. Chairman, I represent the

Rhode Island Fishermen Association.

BRIG. GEN. HYZER. Fine. May I have your name, sir?

MR. BOURNE. Maurice Bourne (phonetic). I have this to say:

I was one who was against your barrier when it came here in '55 or '56. I was criticized severely.

Now, I see -- over a period of some years and some millions of dollars -- that you have come back with three different ideas. Now, I'm afraid that maybe you have not brought back to us the best idea now, where we had to go back again and now we come back this time. Are we sure you have brought back the best idea?

Well, I think the cure -- the medicine is worse than the cure. It will taste that bitter, and stay where we are. That will be my opinion: I'm going to get out of that now.

I stand before you today, tonight, and I look at the plan you have for the Sakonnet River. I heard one of your gentlemen say, the gentleman sitting here, that tide and water was what caused the trouble. I will agree 100 per cent with you.

I know that you have brilliant men in Rhode Island, but here you produce back to us, as the gentleman read a moment ago, of the Sakonnet River, the same plan --

completely against what you have said. Here you are upon the beach, what we say a "short stretch" of Island Park, a stone bridge.

How high is your wall going to be, your barrier? What is your height?

MR. LESLIE. Twenty-five feet.

MR. BOURNE. Twenty-five feet elevation, is that right?

MR. LESLIE. Yes.

MR. McALEER. Twenty-three feet for the sand beach area.

MR. BOURNE. That's high enough. If you said 15, it would be high enough. Now, how can you engineers or your engineers submit this plan to us of this locality when the rest of our rivers, our shores, in the last hurricane, if it had been studied -- and there were studies or supposed to be studies for property owners from the west to the east side of that bay? It's completely washed out.

I have property myself on the waterfront. It would be two miles from that location. I lost probably 25 feet of land. That's what happened there.

Now, on the corner you have there, on that corner, the Manchester Brothers. The owners, I believe, are sitting in the balcony there. I just saw them a moment ago. The great damage was done not on the side of the bank, as

you've got here. There was no damage there where your wall was. It was around through the bridge, and the backlash of your water came down the back and took off all of their buildings. I believe that only runs down the road a very short distance. I don't know what it is to the inch on this (plan).

BRIG. GEN. HYZER. This ties in with the high ground on either end.

MR. BOURNE. Yes, but you have an opening there. Nannaquaket Pond was flooded and completely washed out all this area here, causing thousands of dollars of damage. There it is: Take up all our shores from anywheres along Portsmouth Park.

I heard the gentleman -- somebody must have told him something about Portsmouth Park. The houses and the homes on that bank, a lot of them were washed out.

And this will be what? The tide here that was free to go to Providence, free to go across, exceeded 11 feet and some inches. That was a mile -- that test was taken a mile to the north of this. Now, 11 feet and some inches.

The new highway in the center of the property, they made a little mistake on that and they had to build it up.

(Laughter.)

MR. BOURNE. I was there when they made that mistake. Now, here we are, sitting here tonight listening to something that would cause an 11-foot rise or a 15-foot rise down on our shores.

I know your engineers. I am an engineer myself. I happen to carry papers. But at the same time, I don't pretend to know as much as anyone else. That's that one. That is off now. I know it can't go. If you sit and look at it and reason it, I think you'll tell us that yourselves.

I happened to be one of the State officers at the time I protested.

Now, I think we have a right tonight -- I have a right, after so many millions have been spent, to ask you: If we do put this barrier here, are we to allow or is the Government to allow every bit of dumping, every bit of mud and sludge that's dug out of the bay, Fall River, and in the channels dug out, to be brought down to what they call the deep hole off of Polis (phonetic) Island. My God, that hole hasn't filled up yet, and there's been millions of tons dumped.

Now, where has the sludge gone? What has happened to it?

And without a barrier, with the flow of water, we can talk from now until, well, not hell freezes over, but partly, and it won't change this. All your engineering and

your figures will prove that it won't change. You can use any formula you want to.

We had a gentleman here from the college who was talking. I don't know if he's here. I attended the seminar and I brought up this same question to the seminar, and we couldn't get one word or one discussion on it as to whether it was right, whether it was wrong, or what it was.

That was supposed to be in the interests of this bay and fishing. I waited all day through, but I got a lot of patience.

So I at this time am ready to quit now. I brought my protest in. I protest the Sakonnet River Project. I also say at the present time I will not go along with the Newport Project either.

BRIG. GEN. HYZER. Thank you, sir.

(Applause.)

(Lady raised hand.)

BRIG. GEN. HYZER. Do you represent an organization, Madam?

THE FLOOR. No, but I'd like to switch back to --

BRIG. GEN. HYZER. I want to hear from organizations first.

MR. HOGE. I'm a member of the Narragansett Home Owners Association, but I won't be responsible for -- "they" won't be responsible for what I say. I will be responsible

for what I say, so don't blame them.

BRIG. GEN. HYZER. I already have a letter from the Narragansett Home Owners Association.

MR. HOGE. I don't care what you say, but -- can I have a drink of water first?

BRIG. GEN. HYZER. Yes.

(Mr. Hoge drank water.)

BRIG. GEN. HYZER. What is your name?

MR. HOGE. Mr. Hoge (Philip B.).

BRIG. GEN. HYZER. Narragansett Home Owners Association.

MR. HOGE. Mr. Leslie said that the problems attempted to be solved here were in a new field, and another speaker said that nothing like this had ever been built before.

Now, I'm not trying to contradict them; but there is a place in the world where something like this was done before. About three years ago I spent three weeks visiting my daughter in Rabat, Morocco, North Africa. She told me that many years before, when the French occupied Morocco, they built barriers at the mouth of the river where it emptied into the Atlantic Ocean at Rabat; that gradually over the years the accumulation of sand and silt behind the barriers nearly closed the channel.

Where there formerly had been room for large

ships to enter, there was now only a narrow channel. Most of the big ships now went to Casablanca. Whether Rabat had ever been an important port in the past, I do not know.

BRIG. GEN. HYZER. If we could have it quieter, maybe more of us could hear the speaker.

MR. HOGE. Thank you.

I was only mildly curious at the time and did not give the matter much thought except that it just seemed to be one of those cases where the engineers -- French in this case -- guessed wrong. I am not downgrading the engineers, either. I prefer that these statements of mine about Rabat be checked.

Now, the river at Rabat is not large but the general conditions are somewhat the same as they are in Narragansett Bay. The steep stone cliffs on the Rabat side were not as high across the river, as near as I can remember. It might be our own bay on a small scale.

Whether there are any other similarities, I do not know; but it might be well worthwhile to investigate what happened at Rabat before any final decisions are made. The barriers may do exactly what they are meant to do, but sometimes the side effects are quite unexpected.

I am going to refer to something that happened a few months ago. I refer to the terrible accident in Italy, I believe it was, in recent months, where large chunks of

mountain from the upstream side of a very high dam slid into the lake formed by the dam and displaced so much water that a veritable Niagara spilled over the top of the dam and destroyed everything in its path. The dam, both in design and construction, must have been a wonderful piece of work; but it broke when subjected to pressures far beyond anything it was supposed to without collapse.

The fault was not in the engineering construction, but in failing to take into account the natural terrain and the forces upstream. Now, what they should have done was to consult geologists first.

You speak about barriers. The causeway across Mackerel Cove to the Beavertail end of the island (Conanicut Island) is a barrier itself. Every time a storm comes up, you get lots of sand.

About a month or a month and a half ago it was covered with rocks and sand. They cleared it off quite quickly; but on the other side, in what I believe is called Sheffield Pond, the water is about two feet deep. It's not over four feet anywhere. It's mostly from about six inches to about three feet deep.

They wade all around there and dig clams, and they always have ever since I have been there and that was silted up. If no silt came across there behind that barrier, you've got a natural barrier. You've got the causeway,

which is a barrier. And by gosh, there's silt. Ask anybody who ever dug clams there. It's full of silt. And it is just lousy with clams -- excuse the expression.

MR. McALEER. Good clams.

MR. HOGE. Yes, good clams.

Now, I've drawn this (sketch) of Rabat merely from memory. I don't pretend to know anything about winds and tides and hurricanes, but I am a civil engineer. Been one for 55 years. Graduated in 1908. Well, that's about it.

(Applause.)

BRIG. GEN. HYZER. Thank you, Mr. Hoge.

Now, I want a bona fide official representing an organization, and I prefer to get the people -- I have a request here from the people in Jamestown and the south counties of Rhode Island --

(Mr. Rex raised hand.)

BRIG. GEN. HYZER. What organization do you represent, sir?

MR. REX. Newport Taxpayers' Association.

BRIG. GEN. HYZER. All right, sir. Fine.

(Some individuals withdrew from Council Chambers.)

BRIG. GEN. HYZER. I see some people leaving. If you do, make sure that we have a card from you. Apparently, we have not gotten cards from everyone.

Thank you.

MR. REX. Carl B. Rex, Professional Engineer. I will read my prepared statement.

"1. The south and east shore of Aquidneck Island is left unprotected from Castle Hill Light to Island Park. Flooding in this area will be intensified.

"2. Easton's Pond and the Main Pumping Station for the City Water Works is subject to hurricane sea water flooding. The city will be without drinking water.

"3. Taxes are already too high. This imposes an additional burden of $30,000,000 for something of highly questionable benefit.

"4. Hurricane damage results from rain, wind, waves, and flood water. No sea barrier can possibly exert any control over rain and wind. What about flood water? Two buckets, one empty and one full, if placed side by side and connected with a tube below water line, must eventually come to the same level regardless of whether the tube is 1/16" ID or 1" ID. The only difference is in the time necessary to reach a state of balance. So it is with any sea barrier built with permanent openings. The barrier at Fox Point will protect Providence because it will completely block off the

water. The barriers at the mouth of the bay with permanent openings can only change the time at which the peak flood occurs. What difference does it make to the home owner whether his property is destroyed at 8:00 AM or 10:00 AM? It has been reported that the '54 hurricane established a flood level of eleven (11) feet above mean high tide at Newport and of sixteen (16) feet at Providence. Let us grant that the proposed barrier will reduce these levels by three (3) feet at Newport and six (6) feet at Providence. Does this eliminate flood damage? Of course not. It will reduce the damage, but it cannot eliminate it. Damage costs after a hurricane similar to that off Cape Hatteras in 1944 were estimated for Rhode Island at $205,000,000, with $80,000,000 of it occurring in Providence. The Fox Point barrier removes $80,000,000 from the total, thus leaving $125,000,000 to the lower bay. On the basis of the hurricane tide levels just stated, a rough estimate indicates that $100,000,000 damage would have been encountered in any event. The point is that barriers at the mouth of the bay cannot prevent hurricane damage. They can only reduce it by an amount somewhere in the nature of 20%. Your estimate is as good as mine and vice versa. We all have the right to make estimates.

"The force of waves in a storm is appalling.

The 1938 hurricane waves tore rocks out of the cliff walk face from 5 to 35 feet deep. How will the barriers control the bay waves? If anyone here has experience with Moosehead Lake in Maine -- a totally enclosed body of water approximating Narragansett Bay in size -- he knows that waves eight to twelve feet high can be generated by the wind. All that the barriers can hope to do is to reduce the peak of the hurricane tidal wave inside the bay.

"5. The loss of life and much of the property damage caused by hurricanes in this area during the last 30 years was largely due to lack of timely warning. This is the factor of greatest importance to the people of Rhode Island. Barriers are only a palliative. We who have lived through hurricanes know how to conduct our affairs to best advantage during the few hours of major danger. Heavy rain and normal windstorms are taken in stride, but time is necessary to prepare for the onslaught of a hurricane. If public money is to be spent to major economic advantage, the timely warning area is the one that will yield the most benefit in proportion to cost. Give us an adequate warning system and each man will provide his own safety and damage control program.

"6. The most practical protection against

hurricane damage is insurance bought and paid for by the individual taxpayer concerned. At the present time, hurricane wind, wave, and water damage insurance is either nonexsitent or at such rates as to be beyond the reach of the average property owner. This is where the Government can step in to aid its citizens by guaranteeing insurance losses to well-recognized insurance companies that will write policies for that special group of taxpayers who own property in the hurricane flood water zone, that is, within the twenty-foot contour line above the mean high tide level on the seashore.

"7. The Newport Taxpayers' Association agrees with other community organizations that problems exist with respect to salinity, ice hazard, pollution, and navigation in the bay which have not been fully assessed for their effect upon tourism and the aesthetic of life along the bay. It is believed that other groups will comment adequately on these factors.

"8. For these reasons the Newport Taxpayer's Association opposes the building of the proposed barriers across the mouth of Narragansett Bay and requests that our duly-elected Congressmen take such action as they deem fit to cancel this dam project in favor of an improved hurricane

warning system plus some form of Government-supported insurance program which the citizen can buy at his own expense to provide individual protection against hurricane flood losses."

(Applause.)

BRIG. GEN. HYZER. Thank you, sir. Are you a registered engineer?

MR. REX. Yes. That's in the State of Rhode Island.

BRIG. GEN. HYZER. You, sir?

MR. REX. Yes.

BRIG. GEN. HYZER. I do not agree with your theory of the hydraulic principles involved. I have just spent the last two days in Washington, meeting with the top hydraulic engineers in the country on these problems, and I certainly have great regard for their capabilities in this field.

This matter of insurance has come up several times this evening. I might mention this: I am in wholehearted agreement that if the individual can buy insurance to protect himself, this is fine. Congress went so far as to authorize flood insurance several years ago; but when they were faced with the task of appropriating funds to guarantee the insurance, they have consistently refused to do so because the cost -- so far -- has been

shown to be prohibitive.

Now, this may change in the future, but this is the current attitude of Congress.

(Dr. Hoyt raised hand.)

BRIG. GEN. HYZER. Yes, sir?

DR. HOYT. I represent the Cruising Club of America, which sponsors the Bermuda Race.

BRIG. GEN. HYZER. What is your name?

DR. HOYT. My name is Norris (D.) Hoyt. I live here.

BRIG. GEN. HYZER. Fine.

DR. HOYT. I was called up by Bob Hall, who is the Commodore in the Cruising Club. He had read all your material and he has sent a copy of it out to all members of the Cruising Club. He has asked as many as possible to appear. In addition to this, Sam Livingston and Paul Livingston will appear at your next meeting.

He (the Commodore) cannot see -- and neither can I -- how you can reduce the area through which water can flow by two-thirds and only increase the speed of flow by one-quarter. It would seem to me that the water would flow 200 per cent faster or that less water would flow and you, therefore, would have a certain amount of salinity and pollution and so on and so forth.

We feel that if the speed of the water flow were

increased above three knots, it would make the area impassable to small boats frequently. Now, under these circumstances it would be very dubious that we would hold a Bermuda Race here.

I have gone out of that entrance in the Balera (phonetic), which is a little less than a 12 meter, at power. I had the foredeck in the water to the mast all the way with no barrier.

So I don't know about barriers, but I do know about small boats. I think that it would take very little increase -- with the wind against the current -- to make the barrier totally impassable.

(Applause.)

BRIG. GEN. HYZER. Can you negotiate Point Judith in bad weather?

DR. HOYT. I think that Point Judith, in the first place, is sheltered by Block Island. This entrance is not. There is nothing between us and Spain. That is No. 1.

No. 2: Point Judith has a breakwater outside the inner barrier. Yes, you can negotiate the inner barrier providing the waves are broken up by the outer breakwater.

But we have a different situation here. As the waves come in, depending on the angle of the wind, they break against other land, run into each other, and result in some fairly fractious formation.

(Applause.)

BRIG. GEN. HYZER. All right.

What organization do you represent, sir?

MR. JEFFREYS. I represent the Ida Lewis Yacht Club, sir.

BRIG. GEN. HYZER. What?

MR. JEFFREYS. Ida Lewis Yacht Club. My name is (C. P. B.) Jeffreys. That is often the headquarters of the America Cup trials and the Bermuda Races and so on. My letter to you of April 1 giving my own opinions was accepted by Commodore Mannis (phonetic) of the Ida Lewis Yacht Club and the Executive Committee as their opinions.

I will only restate at this point the main objection, and that is the difficulty of large numbers of small boats, as well as individual boats, navigating the East Passage gap or opening in severe weather. Certainly, a sou'wester against an ebbing tide at the spring level would be a serious thing coming in from Block Island to anyone under sail, and you could really get into trouble. I'm pretty sure that McAleer would agree with that statement.

(Mr. McAleer nodded head.)

MR. JEFFREYS. The statement was made that the small boats can easily navigate the West Chop currents. That, again, is not the same situation. You don't have the

heavy seas coming in with a strong southwest wind. However, the entrance to the Cape Cod Canal is a similar situation, except that it is shallower there, I admit, but the Army Engineers themselves will warn you against going in there in a reasonably-small boat with an adverse current.

I, therefore, would like to register another objection.

BRIG. GEN. MYLES. Thank you, sir.

(Applause.)

BRIG. GEN. HYZER. Incidentally, you mentioned letters. How many letters do we have now? About 140?

MR. McALEER. Something like that.

MR. ALBIGTON. About 150.

BRIG. GEN. HYZER. So have about 150 letters so far, and except for one or two, they have expressed opposition to this barrier, substantially what we heard this evening. Therefore, if you have submitted a letter, well, you are on record with us and your letter will be considered and made a part of our file.

(Brig. Gen. Hyzer conferred with Mr. McAleer.)

BRIG. GEN. HYZER. The last two speakers have been discussing navigation here. Their friend, John B. McAleer, would like to say a word.

MR. McALEER. I don't argue that it would be impossible going through the barrier openings; but thinking

of the model tests, with a strong southwesterly and a strong ebb current, as you point out, there is a steepening of waves in this area directly in front of the barrier.

Now, I am sure that if Norris Hoyt were going out not with Balera but with a much smaller boat, I believe Norris would get in the lee of the breakwater as he approached the barrier and then, of course, he would come through here (indicating), through the opening, fairly close.

Of course, if there's a strong ebb current with him, it would be very rough here, and I am sure that he would get out of this rough area just as damn quick as he could and get into the weaker current areas on this side, and then conditions would be pretty much the same as they are now.

BRIG. GEN. HYZER. All right.

DR. HOYT. I think that when you are attempting to tack under very heavy wind and sea conditions, the boat stops; and if it is under sail, you don't tack. Now, under those circumstances I would not care to tack.

BRIG. GEN. HYZER. Well, I have never sailed anything bigger than a 26 footer myself, so I don't think I would even tackle it at the present time.

(Laughter.)

BRIG. GEN. HYZER. Now, what other organizations

have comments?

(Mr. Northup raised hand.)

BRIG. GEN. HYZER. What do you represent, sir?

MR. NORTHUP. Captain's Club in Newport, and I'm the owner and operator of a pilot boat in this area.

BRIG. GEN. HYZER. All right, sir. Will you identify yourself?

MR. NORTHUP. My name is (William J. T.) Northup. I make about 1,000 trips a year in and out of this bay. I go out any time, any weather, night or day. Sometimes we get caught; sometimes we don't.

We are talking about this barrier. The last week, just the past week, I've noticed up to as much as four knots in the tide between Bull Point buoy and Castle Hill -- four knots.

A pilot came out in the ship a week ago. Coming through Mount Hope Bridge, he said he had between a three- and four-knot tide. That's a new moon tide. That's the exception.

Castle Hill, right off Castle Hill is one of the worst places in the entrance to the bay. It's restricted. Deep water. Any southerly wind over 25 miles an hour at ebb tide is as much as any boat wants to stand.

I have a good boat, a rugged boat, well equipped. It's a deep boat; it's a good weather boat. She was built

for that work. Like I say, we go out three, four, five times a day.

I believe that this barrier in here at ebb tide will increase the current anywhere from three to as high as seven knots' tide through there. Take seven knots of tide going out through that barrier against 30-mile-an-hour southerly winds, and I don't believe a small boat would live in it.

In a southwesterly wind, I wouldn't want to be on the west side in the backwash of the barrier; and I believe that there will be a lot of backwash.

In regard to a 1,500-foot opening, 60 feet, being low water, the way I see it there, I think that cuts off your flow of water there about three-fifths of what it is today. I believe the tide runs at the bottom as well as the top. It might run in under the bottom and out on the top, or in on the top and out on the bottom. The tides are still there.

After we get outside of Beaver Neck, the tide runs around Castle Hill. It runs to the east, dissipates through the east.

On the Jamestown shore the tide runs in close, not as heavy on the east side.

Of course, we've been very lucky here. We did have, though, a couple of bad accidents.

"T-2"

Ships today are of the [redacted]-tanker type. They are economical and have good carrying capacity. They are sea ships and good-constructed ships. Of course, they're getting old now. They are cutting them up and rebuilding them.

But this type of ship today costs, on the average, $300 an hour to operate. That's operating costs, depreciation, and everything.

Now, eight out of ten times the visibility in the bay is good enough to keep on going. I think myself that I would hesitate to come in there if the visibility was under a quarter of a mile going through that barrier.

You have got a 1,500-foot opening. A ship is 525 feet long. If you get in there and if you don't make what you're trying to make, you're in trouble. You've got to come in there with a reasonable amount of speed in order to handle your speed. The minute you slow down, the tide catches you.

Further, the tide does not run in and out of that opening. It runs 45 degrees across the opening.

Now, they are building ships bigger. They run as high as $600 an hour to operate.

If you run a ship out there for 12 hours, you would have a bill of $3,600 (at $300 an hour) before you get in. And if the weather doesn't improve, you're going to lay there until it does get better, because they won't

allow you to come in.

Now, as I say, you can get in and get up the bay, as I said before, eight out of ten times. There would be enough visibility in the bay to proceed up the line.

Eventually, people are going to start looking at their operating expenses, and they'll want to know why their expenses are high. After you point it out to them, what are they going to do? They're going to start looking around for a place that's not restricted. They are going to go elsewhere. There are other ports along the coast that carry oil. Pipelines could be put in.

Also, right off of Castle Hill you go from 40 feet of water into 175 feet of water right at Castle Hill.

Tow boats, I think, would have a very difficult job running through that barrier with extreme tides in small boats. They would have a very difficult time.

So far as sailing boats is concerned, I think you can forget them in the bay. In any wind over 20 miles, 25 miles an hour, with an ebb tide, I don't think they'd even attempt it.

This bay is a beautiful place. Hurricanes, we've had. We live with them. We've learned to live with them. We have a good weather warning service, and I think it could be improved. I know their work. They've done a wonderful job. We haven't got caught as we did in the 1938 hurricane.

I believe that people from out of the bay who want to come in the bay would bypass us rather than try to come in the bay and cause or add to the confusion.

I guess that's all.

(Applause.)

BRIG. GEN. HYZER. Do we have any Jamestown or south county, Rhode Island, people who have to catch the ferry back?

MRS. TOLLEFSON. They've already missed it.

BRIG. GEN. HYZER. They have? Sorry.

All right. Do we have any other organizations represented now?

(Mr. Jemail raised hand.)

BRIG. GEN. HYZER. Yes, sir?

MR. JEMAIL. My name is (E. E.) Jemail. I speak officially as the President of Hazard's Beach. I want to backtrack just a little bit and get this in proper perspective.

As I understand it from my friend, Representative William Champion here, it was back in 1955 that the General Assembly of the State of Rhode Island passed a resolution, after the 1938 and 1954 hurricanes, asking Congress to do something about this, and Congress did something about it. They authorized the Department of the Army to have the Corps of Engineers go ahead with their study, which has been done

so exhaustively.

Now, as far as the people here are concerned, I do not agree with Mr. Leslie's fine summation in which he estimated that 94 percent of the damage would be eradicated by the barriers.

I want to call to his attention that in the hurricanes of 1938 and 1954 I saw the beach that I have practically in matchsticks. I've seen Bailey's Beach, a much larger beach, badly shambled, and Newport Beach in much worse damage.

I think that the damages collectively to all those beaches would run more than six per cent of the damage. No barriers are going to protect those beaches. It's a thing that we have to live with.

Now, I think that the Engineers have come up with a, to me, a very plausible plan. They are a crack outfit, as everybody knows, and they are the elite of the Army and are very well trained and very well versed, and they have a staff of very able assistants.

There have been arguments here tonight by people who are most practical, as far as navigation is concerned, and who knows what they are talking about. Mr. Northup and Mr. Hoyt are gentlemen who know the bay and what it is. Whether this barrier will do what the Engineers say or whether it would have the disadvantage that these gentlemen

say, I am not prepared to say. It's open for argument and serious argument.

But this much I know: If this is going to cost $90,000,000 and if the State of Rhode Island and the City of Newport and surrounding towns are going to put up one-third of the amount, or $30,000,000, I think that that very effort, in itself, would be, in my opinion, an exercise in futility. They simply will not do it. They have lived with hurricanes. They know what hurricanes are. They're warned and they are prepared to stand by.

As to the major question, you say that you have 150 letters, mostly protesting. All the people I have talked to are opposed. I have yet to see anyone who has come out in favor of this thing, and I say to you that it is my measured opinion that the barriers are not wanted in the City of Newport. If you take out of this meeting that idea, I think it would be the correct one.

Thank you.

(Applause.)

BRIG. GEN. HYZER. I think that you have left me little doubt of this.

(Laughter.)

THE FLOOR. I move that we adjourn.

BRIG. GEN. HYZER. Do we have any other groups now?

MR. WHARTON. I'm Charles (H.) Wharton, Wharton Shipyard, Jamestown, representing the Douglas Associates as Vice-President, and Commodore of the Sakonnet Yacht Club. You have letters from all three of us. Mr. McAleer also knows what I am going to say.

I believe, with this gentleman, (Mr. Northup) here, that the worst tide in the narrows will be at Castle Hill. No small boat will ever get in and out of that place with a good ebb tide and a good southwest wind. Mr. Northup knows it and I know it.

I would like to ask Mr. McAleer a question. He just said he would like to see America Cup races. What time of day would you start, Mr. McAleer, the America Cup Race, with 2,000 boats going through that hole?

(Laughter and applause.)

MR. McALEER. You'd have to start early, anyway.

(Laughter.)

MR. WHARTON. You might get out by the end of the race, but you wouldn't get back.

My problem is that the Wharton Shipyard has no advantage whatsoever from that barrier. To start with, like all shipyards, most of them, anyways, on this bay, we're only five to six feet above normal high tide. A good northeaster on a moon tide will wash right across the public road and separate my property. The barrier will be of

absolutely no account to me.

I am one that, two years ago, wrote to Senator Pell and suggested insurance for water damage. His reply was that my letter was "interesting". That's the only --

(Laughter.)

MR. WHARTON. That's the only solution and the only thing that would accomplish what the low-lying properties of this bay require. Then we will have something. Our boats are all insured; my buildings are all insured. If the roofs blow off, I'm fully covered.

The barrier, in our opinion, -- and I'm speaking for approximately 300 members of the yacht club, 40 families of the Sakonnet Yacht Association -- is absolutely no good.

(Applause.)

BRIG. GEN. HYZER. I'll have to admit to being well educated here tonight, although I have heard some of this before. I asked Mr. McAleer the other day why these highly-qualified sailers going in and out of here now couldn't get through a 1,700-foot opening, and "What's all this congestion they're talking about?" He said, "General, you've never seen the 2,000 boats down there on race day."

MR. WHARTON. I'm glad I brought that up then. Mr. Albiston (phonetic) was sitting in my office a few weeks ago and he said to me, "Mr. Wharton, I am not trying to sell you anything." I said, "I know, I know. You

couldn't."

BRIG. GEN. HYZER. Thank you very much.

(Mrs. Tollefson raised hand.)

BRIG. GEN. HYZER. Yes, ma'am?

MRS. TOLLEFSON. I'm Mrs. Tapper Tollefson of Jamestown. I'm not in any position to know anything nautical, so I'm here to learn and to try to evaluate; but I wouldn't want anything to happen to the town, I mean, to the Navy or anything of that type that might cause it to withdraw or hurt our races or our recreational setting.

Jamestown is the meat between the sandwich, and I am concerned. They beat me to it on Wetherill (concerning rock removal), but I had a brainwave that might help to bring down your cost. I wonder if it's feasible.

So I wanted to ask you this: Over at Point Judith one time I think I saw them using old automobiles for barriers. From my garageman, I understand there is no market for them and they won't even cut up old automobiles. The State is flooded with old automobiles.

Whether we do it here or elsewhere, why can't you load a lot of automobiles -- you could get them for a song -- load them with rocks and sink them, and then, of course, make a nice roadway around them? But is it feasible? I really saw it done, I think, out at Point Judith for a barrier.

Now, this is more important, but you said it (the barrier) would be filled with stone and rubble. So why not old cars packed to the hilt and sunk? I'll give you one.

(Laughter and applause.)

BRIG. GEN. HYZER. We certainly appreciate new ideas. I didn't know about old cars.

(Mr. Woodruff raised hand.)

BRIG. GEN. HYZER. Yes, sir?

MR. WOODRUFF. Can I answer the lady?

BRIG. GEN. HYZER. Yes. May we have your name?

MR. WOODRUFF. Robert (E.) Woodruff, Middletown. As one who is unfortunate to reside immediately adjacent to an automobile graveyard, I must say that I'm perhaps one in the room here, anyway, who agrees with the lady.

MRS. TOLLEFSON. The gentleman (Mr. Dunlap) just told me that in LA (Los Angeles) they use old streetcars, and it's good for the fish. They can hide and weave and --

(Laughter.)

BRIG. GEN. HYZER. Well, we will consider the use of cars.

MRS. TOLLEFSON. Most places are flooded with cars. We could clean up Rhode Island.

BRIG. GEN. HYZER. Yes, sir?

MR. WOOD. I'm Henry (A.) Wood (III) and I'm

presently the owner of Clingstone, the house on the rock off Jamestown at the entrance to the bay. I am deeply opposed to the barrier idea, and I have a letter which I think will help. There are a few more points that I would like to mention. One involves the question of the sluice gate.

BRIG. GEN. HYZER. Could you speak a little louder, sir?

MR. WOOD. Yes. On the question of the sluice gate, no one has really brought out the fact that there would be approximately a four-knot tide running. In the case, particularly, of a small sailboat coming out of Mackerel Cove or anywhere in this general area, I assume that there will be quite a suction tending to pull it toward the sluice gates. Essentially, it would be the same as riding down a river and coming to a bridge with a four-knot current being involved.

If there were ground swells, it could be quite serious as to what might happen at the sluice gate -- to small sailboats particularly.

There is one other point that I would like to bring out that I don't think was. I will read you one part of my letter that covered this.

"We are here speaking of only one small part of the Atlantic and Gulf seacoast which is subject to

hurricanes. In order to protect the remainder, where that was possible, suggests placing ten to twenty times this amount of construction, and then a large part of the coast would still be unprotected. Could not this same amount of money be better spent in studying the causes of hurricanes and means of preventing, disarming or diverting them by means of seeding, explosive blast or some as yet undiscovered method."

Perhaps there is someone in the audience that knows more meteorological data that hasn't been mentioned.

BRIG. GEN. HYZER. I am afraid that we do not have enough knowledge on that at this time.

MR. WOOD. You look it.

(Laughter.)

BRIG. GEN. HYZER. We have checked these things out with the Weather Bureau.

MR. WOOD. You see, in this case I think that the spending of $1,000,000 or $2,000,000 quite possibly could prevent a lot of this wind and other damage that the barriers can't prevent.

MR. WHARTON. May I say one word?

BRIG. GEN. HYZER. Yes.

MR. WHARTON. I think this is something every Rhode Islander should seriously consider. A few years ago there was another project here out on Deer Island, to which

the Navy gave approval. The admirals of the district and Tom Gates, then Secretary of the Navy, all told me personally: "If we want to, we'll move out of Narragansett Bay".

They can perfectly well have this approved by the Navy and then move out. If the Navy moves out of Narragansett Bay, Rhode Island is going down.

(Applause.)

BRIG. GEN. HYZER. Is Captain Brandt still here?

(No response.)

BRIG. GEN. HYZER. I don't know whether Captain Brandt of the Navy is still here.

MR. BRANDT. I'm his son, if I can help.

(Laughter.)

BRIG. GEN. HYZER. He was here earlier.

MRS. TOLLEFSON. He (the son) can go home and tell him.

(Miss Bethune raised hand.)

BRIG. GEN. HYZER. Yes, ma'am?

MISS BETHUNE. Are all the people from Jamestown finished?

BRIG. GEN. HYZER. I don't know.

MRS. TOLLEFSON. I live in Jamestown.

BRIG. GEN. HYZER. Are there any other Jamestown people who would like to get something off their chests and who may have to leave?

(No response.)

BRIG. GEN. HYZER. I guess not.

All right.

MISS BETHUNE. My name is Ade Bethune and I live here in Newport. I was told that I had to submit a letter, so I'm going to give it to you; but may I read it first?

BRIG. GEN. HYZER. Yes.

MISS BETHUNE. And then I will have a few questions.

"As a Narragansett Bay property owner who has suffered from water, wind, and oil damage in past hurricanes, as a resident of Rhode Island, and as a citizen of the United States, I hereby register my opposition to the building of the proposed hurricane barrier in the lower bay, and submit the following considerations.

"1. The proposed barrier, or any barrier, can offer protection only against flooding in low, unprotected areas. No system can offer protection against damage from storm rains, wind, and oil spillage.

"2. The proposed barrier is limited to a relatively small area. It does not cover the shores of the Sakonnet River, nor any part of the Southern shore of Rhode Island.

"3. The latest barrier design, with a wider opening and a great number of sluice gates, represents too uncertain

a protection, subject to human and mechanical failures, and a cost in erection, staffing, and maintenance, out of proportion to the actual damage from flooding only (excluding damage from other hurricane-connected causes against which no barrier can offer protection). Flood damage can more easily be averted by less vulnerable means and at a more realistic cost.

"4. The present situation in flood protection, by which each owner of shore property is responsible for the upkeep of his own limited stretch of rock shore, cliff, dyke, or seawall, is anarchic and uncoordinated, thus ineffectual. The common good of every citizen of Rhode Island demand's a comprehensive and systematic approach, but one that will not disfigure the natural character of the bay.

"5. I therefore advocate a comprehensive system of monolithic concrete seawalls or dykes, so many feet above mean high water, to be erected out of public funds, at every low, weak, and populated or potentially hazardous stretch of the entire Rhode Island shore line. This naturally excludes beaches, presently uninhabited places, and other areas where there is no real danger of flooding into the interior.

"6. Narragansett Bay and the Rhode Island shore line is a unique natural asset unmatched, in its particular character, geopraphical situation, and human and biological values, anywhere along the entire East Coast. This immense and irreplaceable natural capital must not be jeopardized for the sake of a limited flood protection which can be better taken care of by a system of defense directly at the shore line itself, where it can do the most good.

"Respectfully submitted,

Ada Bethune".

(Applause.)

MISS BETHUNE. I am very much interested in this plan. Of course, after coming to this meeting, I would not have written this letter in the same way, and maybe I'll write you another one.

(Laughter.)

MISS BETHUNE. Now that I see this, I can see that naturally you have studied the question of protecting the entire area by individual sea walls. However, I believe that this map is somewhat of a misrepresentation. It does show the places that were flooded in the hurricanes, but it does not indicate which of those places are inhabited and populated and which are totally incapable of being protected.

For example, the gentleman who represented Hazard's Beach -- Mr. Jemail, I believe it was -- said he realizes that it's not possible to protect Hazard's Beach and just have to construct something there which can go up to matchsticks, if necessary, because it cannot be protected.

Yet, of course, Hazard's Beach is represented in the pink because it was effectively flooded. I believe it is very important and urgent and also I believe that Federal help is needed to protect populated places and certainly to make a survey concerning zoning, as one of the gentlemen brought up here, of the places that should be protected. And those places should be protected right where they are.

I myself live on the edge of the water and have suffered from hurricanes, and I have often considered the possibility of raising my own sea wall about six feet, but it's not possible for me to do so financially.

I think that there are many people who are in the same situation as myself. If I did it myself and then right next to the end of my property the water would go in, then it would be foolish to do that. This sort of thing would have to be done in a co-ordinated and systematic way.

Now, also, I have a few other questions. Either you or the movie -- I forget which -- showed someone

going through the barrier. You indicated that it was closed and everything was lovely and peaceful on the other side of the barrier. It was very nice and it was effectively represented in the movie. There was lovely music to indicate it.

(Laughter.)

Somebody made the statement that all those waves on the south side of the barrier were just darling little waves. I don't know what happened to them. I don't understand just how this thing was represented. There are fierce waves going up against there. If you have anything to do with redoing that movie or that speech, I think that it should be represented that there are fierce waves going up there.

Perhaps they are somewhat cut down by the barrier down here, but they can pick up a lot of speed; and by the time they hit that wall, they are going to go into all the area around there.

I'm sure that you must have studied that, and I want to say that I have respect for the Engineers and for their work; but there was little point there. I couldn't understand why those little waves were so sweet all of a sudden on that side of the barrier. Living right next to the water, I know the waves are not sweet when the wind pushes them.

Of course, the same thing applies to the West Passage, but I'm not sufficiently versed in engineering matters to deal with that.

Now, I had another question. If I remember it, I will ask it.

Thank you.

(Applause.)

MR. LESLIE: I will try to answer a couple of these questions because I have answered the same question in at least five other communities in New England.

Relative to the question on Fox Point, you have to remember that the movie depicted a scale model. Therefore, it is markedly different in all the elevations. I will not say that the waves will not break over the Fox Point barrier. But the Fox point barrier is designed and shaped to break the waves and dissipate it on the seaward side.

MISS BETHUNE. I see. That wasn't very well explained.

MR. LESLIE. All right. Secondly, at Fox Point, as you recall, there is a pumping plant. The pumping plant has a twofold purpose. One is that the inland streams, fresh water streams, come into the bay there; and then, of course, they are equally blocked from going down the bay by the barrier, too. So the pumping station is designed, No. 1, to take this inland water that comes in and then

eject it over the bay.

MISS BETHUNE. Over the "wall".

MR. LESLIE. Over the wall, in essence, so that it is not held back. The second thing is that although the wave action is broken markedly, there is also a little amount of wave action that spills off. To build a wall high enough to keep wave action out becomes much too expensive. It is much easier to put in a pumping plant which will pump back out the waves. This is cheaper than building the wall higher. So this is what happens.

This -- if I can just digress for a moment -- is the same question that I have been asked in New Bedford, that I have been asked in Dartmouth, at Wareham, New London, Stamford. It is hard for me to make people believe it. All I can do is tell you what we have gleaned from models and what we have worked out, using the best engineering brains in the country. The water does not build up outside the barrier.

Many people have asked, for example, "If you build a barrier up at Fox Point and it holds the water (back) because of this, then won't the water just raise way up elsewhere while the people inside the barrier are sitting dry?" The answer to this is: "No." The interjection of the barrier does not raise the water level other than what it is up to the gates of the barrier. It

does not come out and then automatically rise.

MISS BETHUNE. Where does the water go?

MR. LESLIE. What people forget is that there is a large area on the bay side of the barrier, and it dissipates back. There is no place for it to go; it's got to spread.

MISS BETHUNE. It goes back to us down south?

MR. LESLIE. Yes. But we have found out from tests on every project that we have done that the difference in magnitude because of a barrier is in the magnitude of less than a couple of inches.

MISS BETHUNE. I see.

MR. LESLIE. It is not a matter of feet or half a foot. It is in the magnitude of a couple of inches.

MISS BETHUNE. Good. Thank you very much. You answered that now.

MR. LESLIE. On these points I think you made an observation that we would have to build a Chinese wall.

MISS BETHUNE. Yes.

MR. LESLIE. I am not naive enough to believe that you are saying that we should protect this town today and this town tomorrow; and that in this great expanse in between, no one will ever settle. They will settle in between towns. Then you will have a Chinese wall, whether you want it or not, to protect the people who move into

these areas.

MISS BETHUNE. The people would have to build it as part of their settling there.

MR. LESLIE. Well, this is the problem of New England. It is the problem of the United States. If people enforce zoning, this is another problem. I think that you people in Rhode Island, as in other places, know that zoning is rather difficult, whether it's for flood control or whether it's to have a bar next to some house.

MISS BETHUNE. I wanted to mention something else that I think was a little misleading.

In the description of the hurricane damage, we have heard several times about the loss of life in hurricanes. I don't know whether you realize that the loss of life was almost entirely in the 1938 hurricane. There has been no substantial loss of life since, if any at all.

MR. ALBISTON. Nineteen in '54 -- 10 in Narragansett Bay.

MISS BETHUNE. Yes. Almost all of the hundreds were in 1938 when there was some advance notice, but the people in general paid no attention to it. I don't think it was entirely the fact that it was not announced. I think it is also the fact that the people were too careless. They thought, "Oh, that will never hurt us", you know; therefore, they took no pains to save life, and they did

some foolish things. A better approach toward the hurricane and preparation for it have been able to save more lives.

As far as your manner of presentation is concerned, I feel that you would present your plan better if you pointed out those things.

Also, as far as the coast is concerned, I don't know if you include all the area here. Why is that (pink) area inside the barrier included?

BRIG. GEN. HYZER. The coasts here are those which would be inside the barrier. There are many pink areas that are outside the barrier.

MISS BETHUNE. The coast was presented somewhat differently.

BRIG. GEN. HYZER. We have tried to do this by our footnote (on Page 4 of Information Bulletin), but I agree that this is very difficult to control.

MISS BETHUNE. It doesn't make them popular.

BRIG. GEN. HYZER. I would certainly agree with you. We would work on both sides of this. We would work it very closely with the Weather Bureau to try to improve their forecasting methods so that we can tell what the actual effects will be on the shores.

MISS BETHUNE. All of that has been certainly a great improvement in the last hurricanes, both in the

weather prediction, in preparedness throughout the State, and radio and different services, and also in the attitude of the people. There has been tremendous improvement. It has been very encouraging.

BRIG. GEN. HYZER. We also work on zoning. As Mr. (Edward L.) Hill well knows, we make flood studies at the request of local communities. Unfortunately, after we have made our studies at the request of local communities, very, very few of them are able to do anything about it. This is a local problem. Local zoning, as Mr. Leslie said, is difficult to change.

(Mr. Shonting raised hand.)

BRIG. GEN. HYZER. Yes, sir?

MR. SHONTING. Sir, my name is Dave (H.) Shonting. I'm a physical oceanographer. I wish to speak for myself.

BRIG. GEN. HYZER. All right, sir.

MR. SHONTING. I have here some thoughts of my own. I work for the Navy, but these are not necessarily the Navy's opinions. These concern the various proposals. I will give a copy of my statement tonight to you.

"The Narragansett Bay hurricane protection barrier proposals put forth by the U.S. Army Corps of Engineers appear to provide a hydraulic damping system which will indeed afford a marked decrease in the hurricane tidal amplitudes experienced in the bay. Hydraulic models are

reported to have shown clearly that the modification of Plan 35 will provide protection from high water flooding during the passage of a cyclonic low pressure center moving at the usual speed. The state of the art of hydraulic modelling is so refined that we can place much credence to the results of the modelling of such phenomena as tidal amplitude variations, tidal currents, and gross mass transport through each tidal cycle. It is thus quite reasonable to assume as accurate the claims regarding the magnitude of tidal flow through the channels and the amplitudes of the tides in the bay under normal or storm conditions.

"Unfortunately, the above studies do not tell us anything of what may well be the most important consideration of the proposed barriers, i.e., how might these barriers affect or alter the now-exsiting conditions in the bay? By 'conditions' is meant the distribution of temperature, salinity, dissolved oxygen, suspended sediment, the myriad of bio-chemical substances essential to sustenance of plant and animal populations, and last but not least, the suspended and dissolved material present in the bay rendering perhaps half of the area of the Bay 'polluted'.

"In response to the questions of the barrier effects on the water environment the Army Corps of Engineers (ACE) conducted hydraulic model experiments to assess the proposed barrier (Plan 35) effects upon salinity, shoaling or silting, and pollution.

"As you know, the salinity was modelled as closely as possible to actual salinity conditions within the bay (as determined by Hicks). Thereupon the barrier models were installed and measurements were made of the salinity distribution as a function of depth and location as the tidal cycles were reproduced. Here a fundamental difficulty exists in that the effects of temperature were understandably not modelled. The stability of the vertical stratification is controlled by density variation in the vertical. The produced salinity variations in the barrier model are doubtful to the extent that temperature influences the density structure. Under conditions where the temperature variation from surface to bottom is 8°C and salinity variations 1%, the temperature gradient will have about twice the effect upon density as salinity. For a $\Delta T = 3°C$ and $\Delta S = 0.3\%$ the temperature has about equal effect as the salinity on density.

"In the summer months, particularly, the bay

is density stratified due to the temperature structure. On the average, however, the temperature effect on density is less effective as one moves northward up the bay due to the increasingly strong vertical salinity gradient. We have then a stability variation within the bay itself. The stability is perhaps the most important factor in considering vertical mixing within the water column. How then, can we be sure that the model imitated the geophysical turbulent mixing occurring in the bay when the stability factor was not correctly modelled?

"Salinity

"The results indicated that by 583 cycles there existed a decrease in surface salinities occurring by as much as 50% at some certain locations with the average reduction over the same area being in the order of 20 per cent. If these results are valid we should have some cause to worry. Note that the report did not state if at 583 cycles the salinity distribution was still changing or that equilibrium had been reached. If the former were the case, what about 730 cycles in 2 years or 1460 cycles in 4 years? It is clear that we must attain equilibrium conditions in our model to judge whether the results are describing any long-term effects, which, of course, are the most important. In other words, it is critical to know the actual time variation of the concentration of the variable at the time

of the experiment termination. This would permit rough extrapolation to assess the effects over longer time periods than were modelled. Remember that Narragansett Bay has experienced probably 10,000 to 20,000 years of tides since the last glacial recession.

"The results state: 'Average bottom salinities throughout the entire bay system were increased by about three per cent'. Or, in effect, the bottom salinities were only slightly affected. One might conclude that this result is indicative that the bottom water is being flushed to the open ocean, but not necessarily. Since salinity is a conservative property it does not become usurped from the water as does, say, dissolved oxygen. Thus the relatively small change in bottom water salinity could indicate little or essentially no flushing.

"Shoaling

"The effects of shoaling again are stated as only slight but with disregard for the concept of equilibrium conditions prevailing during the tests. Just what this 'slight' shoaling actually means in terms of actual depth decrease versus time in the prototype is not stated.

"Pollution

"The results of the pollution model tests of

Plan 35 stated that: 'In general, the pollution of the entire bay system was increased, with maximum surface contamination occurring in the Providence River area. Surface contamination in the Providence River and Mount Hope Bay areas was approximately doubled as a result of the installation of the barriers. Pollution from Injection Station I in Providence Harbor, and also pollution introduced at Injection Station 2 in Mount Hope Bay moved downstream into Narragansett Bay at a slower rate with the Plan 35 barriers installed.' Again, these results are deduced from only 400 modelled tidal cycles -- equivalent to about 7 months. It is noted that the tests were performed with the temperature structure not present.

"It is noted in Plates 29, 30, and 31 that the surface pollution appears to be changing, still increasing relatively rapidly at the termination of the 400 cycles and the bottom water is changing in pollution concentration more slowly than without the barrier. This seems to again infer a tendency for the barriers to damp the motion and mixing of the bottom water.

"With regards to the pollution modelling, the results indicate, in the words of the report: 'In general, the pollution of the entire bay system was increased, with

maximum surface contamination occurring in the Providence River area.' It is extremely difficult, if not impossible, to estimate the scientific validity of the model experiments due to the complex problem of modelling geophysical turbulence. However, if we assume the conclusions to be correct, then we indeed have to consider the implications involved.

"For some reason, probably due to Navy probing on the navigational problems, and perhaps due to the results of the aforementioned report, the ACE modified the proposed barrier designs from the 63,000 ft^2 opening of the Plan 35 barrier to the recent plan of a 172,000 ft^2 opening -- a little less than 3 times the cross-section of Plan 35. With this new proposed barrier plan the ACE made new model tests to assess the tidal current and amplitude modifications in the bay. Again, it is quite reasonable to assume the results of the tests to give an approximate true estimate of the currents and tides.

"Now what of the consideration of the salinity, shoaling, and pollution with this new model? On Monday, March 23, 1964, I called Mr. Albiston of the Army Corps of Engineers in Providence and Mr. H. B. Simmons of the ACE Waterways Experiment Station in Vicksburg, Mississippi. I

questioned both men on the further tests on the model with the modified plan. Each indicated that no further tests were made to estimate pollution aspects. In fact, Simmons indicated that he was instructed not to construct any more tests on the new plan's effect on pollution since the new plan provided much wider entrances to the bay; hence, the situation would be improved.

"By no stretch of the imagination is there any scientific justification for claiming that by just widening the barrier entrances the pollution problem will vanish. How much is 'enough'? How much is 'not much' or 'only a small increase'? How much is 'improved'? The point is made by the ACE that the same amount of water will flow in and out of the bay during the ebb and flow of the tide. For some reason, there seems to be a conclusion that this implies the same amount of flushing in the bay. Indeed, this does not. The extent of horizontal and vertical turbulent mixing is controlled by the turbulent characteristics inherent in the inflowing water itself. The extent of the turbulent mixing is related to the actual sizes of the eddies or meanders in the inflowing water. By narrowing the bay entrances the diameters of the turbulent eddies formed as the water passes through the constricted opening are, in effect, smaller and hence would tend to dissipate into

decreasingly-smaller eddies at a faster rate and over a shorter distance than would eddies formed by open channel flow. Thus the turbulent mixing is, in effect, damped by the generation of smaller and more rapidly dissipating eddies. As an illustration: the insertion of a spoonful of sugar into a cup of coffee 1) by placing it in the bottom of the cup, and 2) by vigorous stirring, is an example of having added the same amount of sugar to each cup but producing two very dissimilar distributions of sugar in the cups. Thus the statement that we will have equal volumes of tide-transported water with or without the barrier is not necessarily equivalent to having the same mixing effects in any or all parts of the bay with or without the barrier.

"Another vital problem is that of the fate of the water below the sill depth of 60 ft which comprises about 10% of the volume of the bay. Results from the model tests of Plan 35 indicate a tendency for higher-density stratification within the bay with the barriers present. This implies that water at the surface will tend to remain at the surface, and water at the bottom will tend to remain at the bottom. Now, the water volume shown on the chart, below the 60 ft curve, can only be flushed or exchanged by vertical diffusion. Now, vertical diffusion is decreased the higher the stability or the more intense the

stratification. Thus we have a situation whereby we have sealed off horizontally an important volume of water (located in the East Passage) from the open ocean. The situation is compounded by the fact that the sealing barrier tends to hinder the ability of this water behind the sill to mix with the water above.

"We do not require anerobic conditions to occur in this channel to affect animals and plants but just fractional decreases in dissolved oxygen and the like to vary the equilibrium of the biochemical constituents. We just don't know enough about the dynamics of turbulent mixing to be sure that a long-term effect may not have disastrous effects on bay life.

"A preliminary report by the Public Health Service to the Army Corps of Engineers in February, 1957, concluded qualitatively that the indicated openings in the barriers 'will cause increases in pollution concentrations in the vicinity of pollution sources, and will also tend to concentrate pollution in the surface water layers'. The ACE asked the U. S. Public Health Service (PHS) to make a more extensive study.

"The report of these studies, entitled, 'Effects

of Proposed Hurricane Barriers on Water Quality of Narragansett Bay', prepared by the PHS (1960), is apparently the main source article upon which the ACE claims that salinity, silting, and pollution effects will not be rendered unfavorable by the barrier. Let us examine this report further. The stated purpose of this report is to present results of field surveys and to estimate effects of the contemplated barriers on the quality of Narragansett Bay water.

"A water sampling program was made in the Upper Bay as far south as the Mount Hope bridge (south of Hog Island). Sampling of temperature, salinity, dissolved oxygen, and most probable number of coliform organisms (an indicator of pollution) was made at once and twice daily at 18 stations. The period of sampling at each station was about 50 days.

"This report attempts to analyze the fluctuations of the various parameters caused by the following phenomena: the seasonal variations and the fluctuations due to the tidal transport. The report describes methods of analyzing the time variation data of the variables using well-known statistical methods.

"I believe the following criticisms are valid and worthwhile making:

"On page 25 the report makes the statement: 'It is not possible to accurately describe conditions outside the limits of the survey'. This is indeed a true statement. In order to properly estimate fluctuating variables, one must sample it over many cycles and one cannot possibly predict the function if only 1/7 (50/365) of the cycle is sampled. The report discusses in its results the effects of the barriers on the dissolved oxygen and pollution factor. It indicates that the conditions during the 50-day sampling are representative for conditions had the barriers been in place. 'The only exceptions to this are the changes in conditions which occur throughout the year, which were not represented during the two-month survey, and longer-term changes, for example, from-year-to-year or five-year to five-year variations. However, as has been discussed previously, the changes are due primarily to causes which undoubtedly will not be affected by the barriers'. This is missing the point of the study since the writer is assuming that the barriers will not affect the long-term distributions. Indeed, this is the key question we should ask. Further, 'It is believed that the effects of the barriers will be during periods of time considerably shorter than a yearly cycle. It is

assumed then, that the primary effects of the barriers on water quality will be due wholly to the changes imposed on the principle tide regime of the bay...' It seems that the writer has eliminated all effects which he didn't measure by assuming them to be negligible.

"I could go on with criticisms of the actual analysis, but due to time limitations I can only say that the sampling for tidal variations was poorly planned. For instance, too few points of data were taken per tidal cycle (i.e., one or in some cases two), and also there is a lack of equi spaced data for proper spectra estimates. The important point is that the only available data on the tidal flushing (i.e., mixing effects) is that which I have discussed and which indicates adverse and increased pollution effects with Plan 35. If the ACE had made pollution tests with the new barrier model, we would have some perhaps more realistic data.

"Let us concentrate on the conclusions that were made regarding the tidal effects. 'Conclusions: In general, the barriers will have little effect on the dissolved oxygen resources of the study area. Average dissolved oxygen across a tidal cycle will decrease slightly... and in some cases the barrier will have no effect on the

dissolved oxygen'. We have to consider this statement on a long-term basis (similar to compound interest law). If a traceable amount of oxygen is decreased during one tidal cycle, what happens over one year (700 cycles) or five years (3,500 cycles)? It is quite obvious that exceedingly small and even immeasurable variations which occur during one tidal cycle add up over many years to a somewhat far different environment with perhaps unpredictable effects on the bay.

"Regarding the pollution factors, 'The net effect in the MPN (pollution factor) count during a tidal cycle resulting from the barriers under Plan 35 is expected to be small'. Again we must ask ourselves: What is 'small' over 12.4 hours when multiplied by a year or ten years worth of tidal cycles?"

That is all I have to say.

(Applause.)

BRIG. GEN. HYZER. We will study your report with interest. I am glad that you are criticizing someone else's report and not mine.

(Laughter.)

BRIG. GEN. HYZER. Their definition of "small" was that it was immeasurable. This is a matter for the marine biologists and the experts in this field. I talked

to some of them yesterday and they do not agree with me and they do not necessarily agree with this (pointing to report), either.

(Mr. White raised hand.)

BRIG. GEN. HYZER. All right, sir.

MR. WHITE. Can I get one off short and sweet?

BRIG. GEN. HYZER. Good.

MR. WHITE. My name is William P. White. Right along in here there are about, oh, 45, maybe 75, cottages. I have one right here (indicating). I am of the opinion that putting that barrier where you put it, that you will raise the water with that barrier there.

Now, you made a statement a few minutes ago that it only raises two inches. That is what I would like you to clarify. It will go into the Sakonnet River, and there will be no place for it to go.

BRIG. GEN. HYZER. Let me say this: Our studies indicated that the barrier would relieve the East Passage here. Further, it would protect other areas, too. In most cases we did find that they did raise certain levels during hurricanes in a model test.

My recollection is that in the Tiverton area there was no substantial increase.

Do you know, John?

MR. McALEER. We don't have any exact figures on

that, but I might say that the model test showed that no significant buildup occurred on the seaward side of the Lower Bay structures.

Now, this (pointing) is more like a Middle Bay structure, and the tendency is to a large buildup below the barrier except for the fact that you already have a natural barrier across here -- Island Park, Old Stone Bridge abutments, and all that sort of thing.

So you normally tend to get a buildup. My guess would be that you might get as much as a half a foot rise in level.

MR. WHITE. I didn't believe that "two inches".

(Laughter.)

(Mr. Casey raised hand.)

BRIG. GEN. HYZER. Yes, sir?

MR. CASEY. My name is James Casey and I only want to make two short points. The first is that I want to say that I think it caught the public rather short being asked formally for our complaints or comments and only being presented with your plan at the very same time. Just this evening we have been apprised of your scheme, and at the same time we are asked for our views.

My second point is that it seems inconceivable that if the barriers are going to protect us during such a massive occurrence as a hurricane, that they can at the

same time not interfere during normal times with the marine life of the bay, the salinity, the oxygen content, and the action of the tides.

The area of the sluice gates is very small compared to the area that we have now, and it seems contradictory. It seems that those two things cannot be true -- that it will protect us during a hurricane and at the same time everything will be normal at nonhurricane time. You maintain that the same amount of water is going to enter the bay, closed by that great amount, as it does now. Well, during hurricane time, surely the same amount that normally enters the bay will also enter the bay then. Is that true? The same amount if we had a hurricane today?

BRIG. GEN. HYZER. Oh, no.

MR. CASEY. The same amount of water will enter the bay with the barrier as without the barrier?

BRIG. GEN. HYZER. No.

MR. CASEY. But during nonhurricane time, the same amount will enter the bay with the barrier as without the barrier?

(Mr. Leslie nodded.)

MR. McALEER. Yes, that is right, with the sluice gates open. You see, the difference in levels are very small for normal tides.

I might say that this process is reproduced

not only in the model but by calculations by accepted hydraulic methods as well. We can get the figures both ways.

MR. CASEY. I have a lot of respect for your learned men. But what I can't figure out is this: If the same amount of water enters the bay during normal times with the barrier or without the barrier -- that's true, isn't it?

(Mr. McAleer nodded.)

MR. CASEY. -- then during a hurricane, wouldn't the same amount of water enter the bay with the barrier as without the barrier?

MR. McALEER. No.

MR. LESLIE. I think you can see this chart here. Under normal conditions, you have your tide range, which is in here, which is in the magnitude of four feet. This is what is changing. Now, your average is something in the two-foot range. As we pointed out, with no barrier, the surge of the ocean during hurricanes rises up to 16 feet.

MR. CASEY. Yes.

MR. LESLIE. All right. During this period when the barrier is out there, it reduces it by six feet from this level here if we forget the top line, which is the waves. But there is a large volume of water that is backed

up outside there with a tremendous surge.

We did point out -- and I'm sure that John (McAleer) mentioned -- that there is a 15-minute difference in the amount of time that it takes to fill the bay.

MR. CASEY. Yes.

MR. LESLIE. But up here you have this tremendous volume that is surging in and pushing with a very broad opening that, well, it's from here way up beyond. But now this is all that's open now, and you're holding this water back.

MR. CASEY. Isn't it just going to go through faster?

MR. LESLIE. No. It will have faster currents, yes. We pointed out that your velocity gets up to 10 or 11.

MR. McALEER. In a hurry.

MR. LESLIE. Yes, in a hurry you get up to 10 or 11. But you can't get it all in even with the speed when you figure the amount. It's blocked up at this point (indicating). There comes a point when you just can't get it all in.

MR. CASEY. I think there is a rapid rise of the tide during a hurricane. The tide goes up and down before it has a chance to flow through the opening and fill the bay.

BRIG. GEN. HYZER. One of these gentlemen

presented an analogy here tonight. I am not sure if he is still here. But he had an empty pail and a full pail connected by a tube. If you put a one-inch tube or a two-inch tube in there, then the water is going to flow out fairly soon. But if you put a quarter-inch tube in there, it's going to empty, yes, if you leave it there long enough.

But a hurricane rises and then it goes down before that level gets up. If there is only a 15-minute difference during normal times, it seems that during a hurricane, well, I could see it would take a little longer and go through faster, but I would think that the difference inside the bay would be small. Look, the difference is in raising it a foot or two in normal times, and 16 feet during the hurricane. You see?

MR. LESLIE. You've got six hours under normal conditions. Under hurricane conditions, it comes through relatively instantaneously, you see, in a couple of hours.

BRIG. GEN. HYZER. In a hurricane it will rise up at Fox point to an increase in depth of over 9 feet, but not to 16 feet.

MR. CASEY. Thank you very much.

MR. DUNLAP. I have just one question on this quick rise and fall. What would happen if we had a hurricane like we had in Cuba last fall when it sat there for a week?

These barriers would not do anything, would they?

MR. McALEER. Hurricane floods on the South Atlantic Coast when the water is shallow, there's a wind-tide setup. It's of long duration and a tilting of the waters. In the Northeast it's a dynamic surge. In other words, there's a fast-moving wave, a long, flat wave about a foot high offshore; and as this gets into the coastal waters, it builds up. The studies, the records, all show that slow-moving storms will not build up to really extreme levels. We do have northeasters that can build up the level for some time, but not to hurricane levels.

MR. DUNLAP. I have two more questions. What do you assume to be the mean time between disaster hurricanes to predict them?

MR. McALEER. Do you mean the frequency?

MR. DUNLAP. Yes.

MR. McALEER. The frequency of the 1938 hurricane comes to one every 100 years. The '54 hurricane, I think, is one every 60 years or something of that sort.

MR. DUNLAP. $90,000,000, put out at four per cent interest compounded annually, will earn enough interest -- I would still have my principal left -- will earn enough interest to pay for all the damage; and then I could start over again for the next cycle. From an economic point of view, I haven't seen this cost-benefit ratio. A benefit-

cost ratio of 1.5 does not seem to take into account the interest on money or the maintenance of the structures.

BRIG. GEN. HYZER. Oh, yes.

MR. DUNLAP. I am not clear at all on that.

BRIG. GEN. HYZER. Do you want to discuss this?

MR. McALEER. First we take all the hurricanes over a 100-year period, you might say, to get the average annual losses. In other words, we take big hurricanes, if they are of 1938 magnitude. We divide the damage by 100.

If it is, say, of 1954 magnitude, we divide it by 60, and so on. When we get down to hurricanes and low ones that occur on a 10-year frequency, we divide it by 10 years. In this way, we come up with an average annual loss from hurricanes, and we turn this to benefit, with the damages that are presented.

Now, as to the cost, we figure those the same way. There is the $90,000,000. We have to pay interest on this. We have to amortize it. We have to have a crew that maintains and operates these structures. These are all figured in to get the average annual cost, which is compared with the average annual benefits.

MR. LESLIE. I would like to add one further thing. We in the Corps of Engineers hate to use the term, "frequently". We figure that the 1938 hurricane has a frequency, as John said, of one every 100 years or so.

The 1954 hurricane has a frequency of 60 years.

Yet, 1938 and 1954 were only 16 years apart. These are "guesstimated", if I may use that term in good engineering parlance, as to when hurricanes should occur; and this is based on the best records that we have. But it's like a horse race. You have a form sheet, but the horses don't always run that way.

BRIG. GEN. HYZER. A better term than "frequency" is: likelihood of occurrence. In other words, there would be a one per cent chance each year that the 1938 hurricane will reoccur.

MR. DUNLAP. "frequency" was your word. I used the words, "mean time between hurricanes".

BRIG. GEN. HYZER. It is a misleading word which we use, I agree.

MR. DUNLAP. I want to clear up a little confusion. My distinguished colleague representing the taxpayers is a very fine mechanical engineer, not a hydraulic engineer.

I have a hydraulic question for you. This picture here made in June, 1963, presumably represents the model made. I ask: Where is the 4,600-foot long breakwater at Coddington (phonetic) Cove? Certainly this belongs in the model. Now, I saw it in the movie. The movie was taken since July, '63. I did not see it in the photograph which you gave us. If you look at that photograph, there is no

breakwater there, and this is an important part of the model.

This is a hydraulic question, and this is your report, General, and I criticize it on that basis.

MR. McALEER. I believe that that is in the model although it's not on the plan.

MR. DUNLAP. I said you got it in the movie.

MR. McALEER. Touche on that.

(Mr. Brandt raised hand.)

BRIG. GEN. HYZER. Yes, sir?

MR. BRANDT. The 1938 hurricane didn't have all negative effects. As a side effect, it opened a passage which resulted in possibly the largest area for boating in the United States in dollars and cents. Now, I can't estimate what the value of that is, but I just offer that as an example.

BRIG. GEN. HYZER. I would be happy to take you along to Cape Cod with me when we get down there. I'm afraid they won't agree with you.

MR. BRANDT. Neither did these people in 1938.

(Mrs. Dunlap raised hand.)

BRIG. GEN. HYZER. Yes?

MRS. DUNLAP. I'm another Dunlap (Mrs. Anne Slater Dunlap). I represent the Middletown Garden Club. During our meetings each Monday for the last two months

we have talked about these hurricane barriers. Some of us have been up to Providence on the 29th of February and heard Mr. McAleer and Mr. Albiston speak, and we saw the film this time and have been studying these reports since.

We have had a good deal of conversation with the Oceanographic Department at URI, and I was authorized to write a letter to you yesterday. I have not got it finished, but I do have some rough drafts and some notes here. I can include a few points that have not been brought up this evening.

BRIG. GEN. HYZER. All right.

MRS. DUNLAP. We are very much concerned about the biological and aesthetic factors involved, as well as in small boating and economics (vast sums of our tax money no matter how it is financed). We are well aware that all of these problems cannot be studied exhaustively; however, we do feel the biology, pollution, economics, recreational and aesthetic aspects have not been probed sufficiently to take the gamble. At the present time there are far-stronger teams of oceanographers and research economists available at the University of Rhode Island, and they have far more research equipment available with which to work than was the case when your supporting studies were done.

We feel that the Army Engineers in their latest

report have placed far too much importance on a very small amount of biological and water quality research and seem to have misinterpreted or discounted some findings.

Some of us have read Professor Saila's paper on winter flounders, and I have that here. I think this was only one of two pieces of biological research that was done that you used, as I understood it from some of the oceanographers. This simply tells us that they have picked up flounders from Mt. Hope Bay and the Sakonnet River, put tags on them, switched them around, and then waited for fishermen to find them and report them; and they found that they have gone over a little 30-foot barrier just north of the Stone Bridge area.

Now, this goes to prove that flounder climb a 30-foot barrier down the other side. But I am also told that a good many people here know that if you put flounder in a tank with straight sides, that the flounder can somehow even come up over that, so this study doesn't prove anything new.

We understand from Professors Nelson Marsh II and Theodore Smayda at URI Oceanography Department and others that this flounder study and one rather inconclusive study on the quahaug by Professor Hicks are the only biological reports done for the Army Engineers.

We understand also that the URI Oceanography Department is about ready to embark on a study of the "red tide", a scourge about which there is little scientific knowledge. Red tides have been seen in upper Narragansett Bay already, and it seems logical to believe they will increase in severity if the lower bay barriers are built. Severe red tides have been noted in recent years in Chesapeake Bay, the Gulf of Mexico, the Gulf of Maine and in Japan. The water is blood red, sometimes for 200 miles across the patch, because of the density of these microscopic organisms in the sea water. There are strong suspicions that the red tide organism is directly responsible for the death of tremendous numbers of fin fish (perhaps 90%) and for the poisoning of humans eating affected shellfish. It is not known if the gills of the fish become clogged with the red tide organisms or if a toxin is produced. It is known that the red tide organism thrives in salt water enriched by sewage pollution and warmed more than usual by the summer sun, as when lack of churning of the deep water allows for stratification of the water.

It is also to be expected that barriers would cause a reworking of the bottom of Narragansett Bay, the formation of new channels and the loss of existing channels.

could
This/conceivably cause the destruction of shellfish (quahaug) grounds, whether by silting or erosion. We understand that definitive studies have not been done in your model basin at Vicksburg on this problem, nor have any salinity studies been done with the new model at Vicksburg. Your first studies indicated that there might be a 20% loss in salinity in the surface water in the bay.

Today I heard Mr. McAleer say that there would be no change in salinity.

MR. McALEER. I said that there would be no change in salinity of such magnitude that it would affect fish or pollution and so forth.

MRS. DUNLAP. You say this loss would be lessened somewhat with the new plan; you are not, as engineers, concerned with a loss of this magnitude. However, Professors Marshall and Smayda, as biologists, are concerned, and we would agree that their apprehension is well-founded. It is well-known that much marine life is intolerant of very small variations in salinity, chemical content, temperature, and ice cover, and it varies with the life-stage involved. Variations as may be expected with barriers could well mean the difference between survival and reproduction, and death.

It seems to us that the barriers, if built,

would give people a false sense of security, and real estate developers would have a heyday dredging in shallow water areas to fill in adjoining swampy areas, then offer the public quantities of new housing that would be vulnerable to water damage despite the barriers if and when another hurricane should strike.

It is well-known that bays, estuaries and related marsh areas are strategic as spawning and nursery grounds for many species of fish and shellfish. If our country is to have fish and shellfish for food for our expanding population fifty and one hundred years from now, we had better NOW prevent (1) destruction of breeding grounds, (2) compounding of pollution problems, and (3) changes in salinity, icing, etc., that might prevent the maturation of eggs and growth of young fish and shellfish.

So I think that what I said here tonight, all the Garden Club members will agree with. They agreed yesterday that a letter to this effect should be written.

We know so little about what biological changes will take place. A lot of it is a matter of conjecture. But we are not willing to take the risks. We don't think it's worth it. We like the bay the way it is.

(Applause.)

BRIG. GEN. HYZER. We have spent $200,000 at URI

and HEW and Fish and Wildlife Service. I hope we've gotten something for our money.

MRS. DUNLAP. I think now that if these gentlemen wish, they can talk with you some more because I think they have done a lot of research since they have talked to you.

BRIG. GEN. HYZER. We expect them -- particularly the Public Health Service -- to have additional comments, but we do not have them yet.

MRS. DUNLAP. Do you have an extra copy of the report of the Public Health Service, by any chance?

BRIG. GEN. HYZER. I don't know.

Do we have an extra copy, John? Are copies available of the Public Health Service report?

MRS. DUNLAP. Where may I obtain one? This gentleman (Mr. Woodruff) here has one.

MR. WOODRUFF. Robert (E.) Woodruff. I'm a wildlife biologist, and I would like to take up about two minutes of your time, if I may. I would like to read this. It would take me just about two minutes.

BRIG. GEN. HYZER. All right.

MR. WOODRUFF. "This statement has been prepared following consultations with a number of individuals who are both interested in and qualified to judge various biological and physical aspects pertinent to the barrier proposal.

"Since I am a biologist, I feel I should limit my statements to the biological aspects of the proposal. Principally, I am concerned with the fact that there has been no attempt made to assess what physical changes in water quality would result from the 'new' plan, and thus what effects this would have on marine organisms in the bay. Statements by the Army Corps of Engineers indicate that 'negligible effects to fish and shellfish in the bay' would result from the installation of the new barrier.

"As emphasized by several biologists, what are minor changes in temperature, salinity, etc., to the engineer may indeed be major changes from the biological standpoint. How can 'no increase or decrease in temperature or salinity' occur when the opening in the West Passage will be reduced by approximately 75% and that of the East Passage reduced by about 55%? In spite of wider openings and sluice gates, this is a considerable constriction and I seriously question whether the environment would remain unchanged.

"Our tidal salt marshes are vitally important nursery areas for egg, larval and immature life stages of many of our commercially-important shell and fin fish species. Recent estimates indicate that there are 4500

acres of such marshes in Rhode Island, a large per cent of which are in the bay. To my knowledge, no assessment of the possible damage to these resources under either the old or new proposals has been made.

"Probably for financial reasons, no long-term studies of the effects of the barrier on either water quality or life in the bay have been made, and it may well be that the long-term effects would be most significant in reducing productivity in the bay. In the letter accompanying the Biological Investigation submitted to the Corps of Engineers by the U. S. Fish and Wildlife Service it was recommended that further determination be made as to the year-round pattern of salinity which will prevail in the Upper Bay areas less than 20 ft. in depth under the plan for increasing the combined barrier openings. This is an indication that the Fish and Wildlife Service was not entirely convinced from the two-month studies of salinity that enough information was at hand.

"Many good studies of the shell and fin fishes in Narragansett Bay have been conducted at the Narragansett Marine Laboratory. These have given us some very worthwhile information on these resources over the years. However, I feel we need considerably more information on

the life histories of particular species before we can say with certainty that it will be or will not be affected by such possibly drastic environmental changes as a barrier across the mouth of the bay.

"Without quoting at length, I would point out that the biologists who made the studies of the fin and shellfish in the bay and the U. S. Fish and Wildlife Service in its letter accompanying these reports to the Corps of Engineers, in spite of the fact that their general feeling was that damage would be limited (with the old plan), pointed out repeatedly that the barriers could have serious effects on these resources.

"In short, I concur with Dr. Nelson Marshall, Professor of Oceanography at the University of Rhode Island, that, as he put it, 'it is a gamble'. I am not at all certain what the odds are and I would prefer not to stake my tax money and the productivity of Narragansett Bay on a gamble the magnitude of this one."

(Applause.)

(Mr. Mahoney raised hand.)

BRIG. GEN. HYZER. Yes, sir?

MR. MAHONEY. My name is (James F.) Mahoney. I'm Secretary of the Conservation Commission of Newport.

We have withheld any decision pro or con on this subject because we are primarily concerned with the ecological balance. We have tried to find someone that would deal pro or con specifically with the problems. We have even sent out some certified letters and gotten no accurate reports.

Now, if we address a letter to you directly, do you think that you would provide us with copies of the reports? Specifically, there were 11 reports from the Fish and Wildlife (Service) dealing with hard-shell clams, quahogs, salinity, and so forth.

BRIG. GEN. HYZER. These reports are all public. They're available to anyone who wants to come in and read them, and they're available for distribution to certain agencies. I notice that these people have the Public Health Service report. These are all based on the old plan, I agree; so there is nothing secret about anything.

MR. MAHONEY. I am not speaking about them being secret. I'm seeking specific reports.

BRIG. GEN. HYZER. Which specific report would you like?

MR. MAHONEY. The 11 reports, specifically, that were addressed to the Fish and Wildlife (Service).

MR. LESLIE. That's the only report we have.

MR. McALEER. That is the only report on Fish

and Wildlife.

MR. MAHONEY. What is the date of that?

MR. McALEER. 1959. That was for the plan with 63,000 square feet of waterway area, as compared with the larger.

MR. DUNLAP. Is there a bibliography that you could even pass out?

BRIG. GEN. HYZER. You can look at these reports either here or in our office.

(To Mr. Albiston) Do you have them?

MR. ALBISTON. Yes.

BRIG. GEN. HYZER. They are available at the Providence office. They may be available, if you wish to pay for them, from the Fish and Wildlife Service, if you care to get a copy of your own from them.

MR. WOODRUFF. Some of us have tried to get a copy of these reports but have been told that they were out of print.

BRIG. GEN. HYZER. That probably is true. If you would like to come up to Mr. Albiston's office, however, in Providence, why, you can sit down and go over it all you want.

The Newport Historical Society has a copy, I understand. There may be other copies around.

MR. SHONTING. The cost of reproducing reports

should not deter you. When you have spent $1,000,000 to gather this information, it should not be made difficult for us to obtain this information. You should be able to give those reports out free.

MR. HILL. We don't have enough money for that.

BRIG. GEN. HYZER. (To Mr. Shonting) I don't agree with you. As a taxpayer, do you want to put out free all of your Navy reports to anyone who is interested in them?

MR. SHONTING. If it's going to affect them, like people in the bay, I would have to.

MR. DUNLAP. May I suggest, General, that you publish a one-page bibliography that you could distribute at very little cost? Furthermore, can I suggest that you give one copy of the pertinent reports to important libraries in the area? I suggest the Redwood Library here in Newport, Newport Public Library, Providence Public Library. Three copies of each report; one to each of those three libraries.

BRIG. GEN. HYZER. Yes, we could certainly do that, if copies are available.

MR. HILL. I would like to point out one thing: These reports were made for the Corps of Engineers for their use. We just have a limited number of copies of these. The copies, additional copies, would have to come from those other agencies. Now, we pay for these copies out of

appropriated funds. We do not have enough money to print very many of them. I assume that a copy like this would cost somewhere around $10 just to print it.

MISS BETHUNE. How many did you make?

MR. HILL. To distribute copies at this cost at this stage of the game would be very expensive.

MR. WOODRUFF. Once a press is set up, preparing 1,000 wouldn't be very expensive.

MISS BETHUNE. How many were published in the original edition? You don't know?

MR. HILL. No, I don't know.

MR. DUNLAP. Maybe we'll write to Senator Pell. Then they will be put in the library.

BRIG. GEN. HYZER. If we don't have copies available, --

MR. DUNLAP. He's a "Senator", General.

BRIG. GEN. HYZER. -- the Newport Historical Society has one here. How many people are going to go through these reports?

MRS. DUNLAP. Not many, but they should be available.

BRIG. GEN. HYZER. They are available.

MR. DUNLAP. We don't have anywhere to go.

BRIG. GEN. HYZER. Doesn't the University of Rhode Island have copies of these?

MR. WOODRUFF. I had to steal a copy from the Audubon Society whom I am employed by, and on the copy it says it belongs to the Rhode Island Health Service. Mr. Ise's name was on it. My boss borrowed it from him, and I was told not to take it out of his office, but I ran out with it for 48 hours. I think it was one of three copies in the State of Rhode Island of the biological appendices.

MR. MAHONEY. That is incredible.

MR. WOODRUFF. I want to see the facts -- not somebody else's summation.

(Applause.)

BRIG. GEN. HYZER. These facts are available, and I wish that more people would really study them who have the capability to understand them.

MR. MAHONEY. I didn't even see a copy of it.

BRIG. GEN. HYZER. May we have your name and address, and we will tell you where you can get a copy.

MR. MAHONEY. Yes.

BRIG. GEN. HYZER. So that it will be available to you.

(Mr. Taylor raised hand.)

BRIG. GEN. HYZER. Yes, sir?

MR. TAYLOR. My name is (Erich A. O'D.) Taylor. I just wanted to thank you very much for your extreme courtesy and that of your people who have been here.

I was active in different things at various times, and I know that when this thing was set up, you were doing exactly what the Congress of the United States asked you to do. They didn't ask you to find 28 other ways of doing it. They asked you to devise plans on barriers and that kind of thing. This I think you people have done.

If the people here -- and I'm one of them -- don't want these barriers, then we should not, I think, be as rude as some of the gentlemen and ladies have been to you tonight.

I think we should look at it this way: You've done your job; it's up to us now to go to our Congressmen and our Senators and tell them to see to it that we don't get these barriers.

Now, I think that you have furnished us with information showing us what might well happen. I think that everyone has now been apprised of the information that you have presented to us here and tried to present. I can only admire what you have done.

BRIG. GEN. HYZER. Thank you very much.

(Applause.)

BRIG. GEN. HYZER. I will take exception to one of your statements, and that is the statement on rudeness. I have been impressed, knowing the feelings that Newport

has on this barrier, I've been quite impressed with the courtesy and good humor which everyone has shown tonight; and I certainly do appreciate it. Therefore, in this regard I can't agree with you, but I wish to thank you.

MISS BETHUNE. I have just a very brief question concerning your model for which I have the utmost admiration. I think it is something that staggers the imagination. I didn't notice or couldn't see from the movie whether the bottom of it is flat or whether it is also in relief.

(Mr. Leslie nodded.)

MISS BETHUNE. The whole thing is in relief?

MR. LESLIE. Yes.

BRIG. GEN. HYZER. It is distorted relief for hydraulic purposes, just like these charts are. In other words, it's 10 times the vertical scale. Most of these models run about 10 to 1, but they are correlated on hydraulic similitude so that we get the reaction in the model the same as we get in the basin.

MISS BETHUNE. Do you have the same distortion above water as below water, with the water moving?

BRIG. GEN. HYZER. Well, the main thing is affected by a hurricane tide, yes. The larger model is to scale. In the navigation model, it was desirable to show that for this purpose.

MISS BETHUNE. You mean that was to scale.

BRIG. GEN. HYZER. The big one where you saw the carrier going through was to scale.

MISS BETHUNE. That was not distorted?

BRIG. GEN. HYZER. That is right.

MISS BETHUNE. I see.

(Mr. Moore raised hand.)

BRIG. GEN. HYZER. Yes, sir?

MR. MOORE. Ed (J.) Moore, small boat owner. On this thing, nobody seemed to mention that we don't just get the hurricane waters the day of the hurricane. We get them two or three days ahead of time.

In that scale model, did they take in that effect, too?

BRIG. GEN. HYZER. Yes.

MR. MOORE. There is water pouring in before the storm.

MR. McALEER. Are you thinking mostly of waves, sir?

MR. MOORE. Yes.

MR. McALEER. The large waves?

MR. MOORE. And the flood tide.

MR. McALEER. The forerunner tide was included in the study. In other words, there is some rise that advances ahead of the storm.

MR. MOORE. Thank you.

(Mr. Elston raised hand.)

BRIG. GEN. HYZER. There is another question back here. Yes, sir?

MR. ELSTON. Frank Elston. I was wondering as to this noble experiment, if it doesn't work out, will the pile of rocks be removed?

(Laughter.)

MR. ELSTON. The other question was, and I'm quoting from what you people express, "We hope", "In my opinion", "I believe", which leads me to believe that it is an experiment such as down in Ohio and Mississippi Valley.

My other question is: Why is it you didn't originally schedule a hearing in Newport? We had to put pressure on to get a hearing. Fall River and Providence came first. Why?

(Laughter.)

MR. ELSTON. It isn't funny.

BRIG. GEN. HYZER. We normally have hearings at the beginning of a study. We don't normally have hearings prior to submission of a report unless it is obvious that there may be some opposition and so forth.

Now, in this case, we originally scheduled one hearing in each state. The one in Rhode Island was to be at the head of the bay, where people could go from Newport or from the other side or from Jamestown without any trouble.

The hearing in Massachusetts was originally scheduled in Fall River. They requested that we switch it to Swansea so that people in this area could all attend.

Now, as soon as I received the pressures -- we got the pressures from both directions -- I happened to be in Washington one day when Senator Pell's office found out I was in Washington and got hold of me down there at the same time, I guess, that the local people here -- the Mayor and his Council and Congressman St. Germain -- had put the pressure on through my office.

I immediately said, "Yes, we will be happy to have a hearing in Newport." The only day that I had available was the 15th that I knew of, and we are here now. The original location was selected by the Governor's Office.

In other words, we work through the state, normally, and we say, "We want to hold a hearing in Rhode Island. Where should we do it?" He said, "Providence is the funnel here." We are happy to be down here in Newport, even if we are somewhat battered.

(Mr. Dunlap raised hand.)

BRIG. GEN. HYZER. Yes, sir?

MR. DUNLAP. I don't feel that I was rude earlier.

I now have another hydraulic question. I see a little note here which I think is somewhat misleading. It says that there is a reduction in wave action. Now, actual

wave height is unchanged except at the Newport area, as I see it. The wave height runs the breadth of the colored swath, right?

BRIG. GEN. HYZER. Yes.

MR. DUNLAP. But there is a note there which says that there is a reduction in wave action.

MR. McALEER. The wave "level" will be reduced.

BRIG. GEN. HYZER. It should read that the elevation of wave action is reduced. That would be a better term. There is actually some change in wave action, too, but it is not much.

MR. DUNLAP. I have another point. You were looking for proponents at the beginning of the meeting. I think the group should know that Senator Pell at this point is a proponent of this barrier. I have it here. He says, "In my mind the pros outweigh the cons."

I think this piece of information typically lends force to Mr. Taylor's remark that you should write your Congressman, especially your Senator.

BRIG. GEN. HYZER. Senator Pell has not made this available to me as yet. I don't recall this. He has been very interested, but he has refrained from commenting to me.

(Miss Bethume raised hand.)

BRIG. GEN. HYZER. Yes?

MISS BETHUNE. I belong to a local organization,

association, and they are anxious to send you a letter. I would like to know how much longer we have to send in that letter in order to have it in your record. They are expecting to have a meeting within the next week or two weeks.

BRIG. GEN. HYZER. Oh, that will be all right.

MISS BETHUNE. All right. In other words, they can discuss it at that time?

BRIG. GEN. HYZER. Yes. I would like to wrap this up as fast as possible, particularly this phase of it; but it looks like we may have to wait for some time for a final Public Health Service report, for example, and there are other phases which we have not completed as yet.

MISS BETHUNE. This would be before the end of April, then?

BRIG. GEN. HYZER. That will be all right.

(Mr. Woodruff raised hand.)

BRIG. GEN. HYZER. Yes, sir?

MR. WOODRUFF. I have some question about whether this proposal is going to make it or not, but I have been very anxious to have the Corps of Engineers involve themselves in something worthwhile in the Narragansett Bay, and I propose that the Corps of Engineers -- of course, this cannot be initiated by me; I assume that it must be by the Engineers -- but many of us, as you know from the

discussion tonight, are concerned about the bay. I assume that the Corps of Engineers is deeply involved in pollution or sanitary engineer work in various places.

MR. LESLIE. No.

BRIG. GEN. HYZER. Let's say this: We are not "directly" concerned. This is a State problem except when the Public Health Service is involved.

If interstate waters are concerned, we are very deeply concerned as to whether our projects will affect pollution or vice versa. Not so much our coastal projects, but our flood control projects, for instance, may be used to ease pollution or to have a beneficial effect on it.

In that respect we are involved with it, yes. Of course, we are charged by law to be concerned with oil pollution.

MR. DUNLAP. You've been very generous to me, but I want to make a slight correction. I don't want to mislead anyone as to what Senator Pell said, and some people think I may have. May I read what he wrote?

BRIG. GEN. HYZER. Yes.

MR. DUNLAP. He said to me or to my wife here who wrote asking for a report and didn't get any: "While I recognize that there are both pros and cons to this matter, the pros presently outweigh the cons, but I intend to reserve my own decision until a later date when all

viewpoints have been clearly ventilated."

This is a change from the inference that I made. I hope that the people here will understand his point of view.

BRIG. GEN. HYZER. Yes, I understand. In fact, I guess the Governor has been quoted in the newspaper as saying just the opposite.

Senator Pell had two representatives at the model test meeting.

Is there anything else now? A lot of people are preparing to leave now. Most of us have disappeared, but a few people are beginning to put their coats on. Is there anything else?

MR. BRANDT. On this pollution question, the Corps of Engineers is directly responsible for the inner waterway, right?

BRIG. GEN. HYZER. Right.

MR. BRANDT. The maintenance of it?

BRIG. GEN. HYZER. Yes.

MR. BRANDT. Well, you must be very directly involved with pollution.

BRIG. GEN. HYZER. We are involved in many respects with pollution. That's correct.

Is there anything else? Does anybody have a last word?

(No response.)

BRIG. GEN. HYZER. I want to thank you. I've learned a great deal this evening myself. All of your comments will be thoroughly considered.

(Applause.)

(Hearing adjourned at 12:25 a.m., Thursday, April 16, 1964.)